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# STEEL


ESTABLISHED 1882


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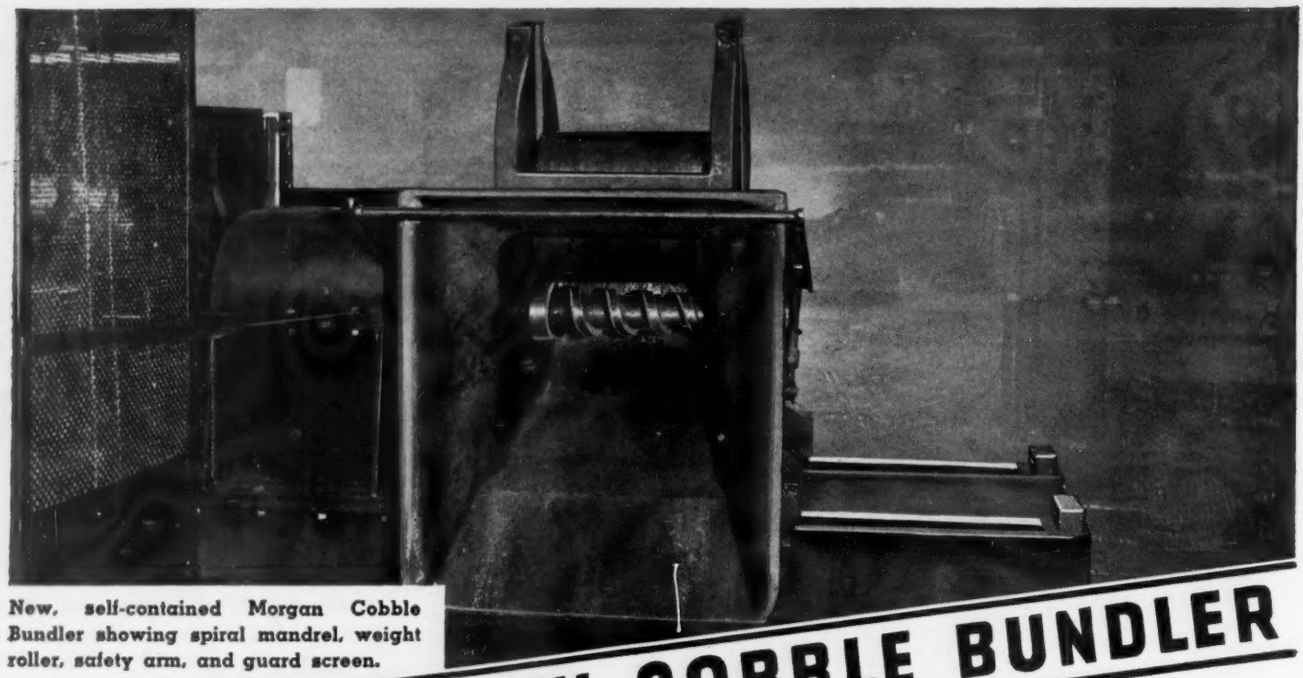
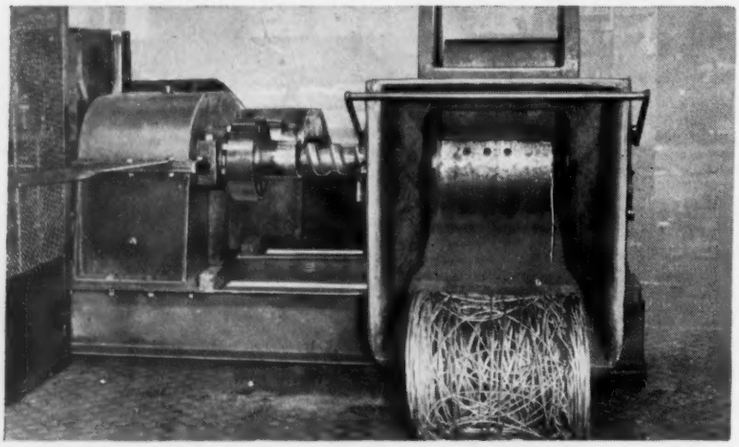


New, self-contained Morgan Cobble Bundler showing spiral mandrel, weight roller, safety arm, and guard screen.

# MORGAN'S NEW COBBLE BUNDLER

Cobble Bundler in operation. This view also shows motor and controls.



As the motor is reversed the mandrel frees itself from the center of the bundle, causing bundle and hopper to move outward along the trackway until bundle is free, when it discharges by gravity. Hopper is then pushed back over the mandrel, and machine is again ready for use.

## Takes the Lag out of Cobble Handling

Even cobble handling is made simpler and safer by typical Morgan thoroughness in design and perfection of details. This improved Morgan Cobble Bundler is a self-contained, semi-portable unit which takes up cobble quickly and effectively, bundling it to size suitable for open hearth charging boxes.

It is a complete unit ready to run; equipped with AC motor with solenoid brake or a DC motor with dynamic brake, a control panel, and special safeguards. The tapered mandrel has a coarse spiral thread which, as the motor is reversed, strips off the bundle, which then discharges by gravity. Safety of operation is stressed, an important feature being the guard-arm which stops the motor instantly with any up or down movement.

Write for further details on this Bundler and on other improved Morgan Rolling Mill Equipment.

**MORGAN CONSTRUCTION COMPANY**
**WORCESTER, MASSACHUSETTS, U.S.A.**

R-60

LET MORGAN (WORCESTER ENGINEERS AND MANUFACTURERS) REMOVE THE LAGS

# As the Editor Views the News

■ STEEL production slid slightly from the peak last week, declining 1½ points (p. 27) to 92½ per cent of ingot capacity. It seems unlikely that the recent 94 per cent level again will be reached in the near future since the majority of consumers now are in a comfortable position with reference to steel supplies. New buying is small (p. 83), many consumers being covered through the first quarter. Furthermore, the moderate price policy of the steel industry has dispelled alarm about getting under cover. Steel consumption continues at a high rate. Export business in steel is not up to earlier expectations. The automobile industry (p. 38) is operating at the best rate since July, 1937 (p. 38), with weekly output around 118,000 cars. Colonel Ayres (p. 41) expects a moderate rise in business in 1940.

• • •

**Expanding Wisely**

Upsurge of industrial activity here and the war in Europe has confronted many managements with the question of plant expansion. Still fresh in the minds of many is the World war aftermath when many companies found themselves with excess floor space and much equipment useless for peacetime requirements. STEEL's survey of machine tool builders (p. 23) reveals that this industry is concerned with tomorrow in its thinking and planning of today. Its emphasis is not on expansion, but on modernization based on basic economic and technological changes. . . . In Canada (p. 26) war economy and industrial expansion based on war requirements are reflected increasingly. . . . Profits in business, says T. M. Girdler (p. 28) are vital to the national defense. . . . The government has appealed the Walsh-Healey steel wage case to the Supreme Court (p. 28).

• • •

**Changes in Labor Board?**

A proposed uniform contract for the scrap trade and codification of trade customs and terms will be considered (p. 43) at the coming annual meeting of the Institute of Scrap Iron and Steel. . . . Long in preparation, Chicago's Museum of Science and Industry (p. 40) is to be opened to the public early in 1940. . . . Long awaited house committee investigation of the national labor relations board last week (p. 33) got off to a rousing start. Observers drew the impression that changes in the board's personnel and revision of the national labor relations act seem assured. . . . Outlook for the machine tool industry, says Wendell E. Whipp, at least for the first quarter, is the best (p. 26) since pre-depression days. . . . The United States (p. 34) reserves its trade rights under international law.

• • •

**Reduce Fatigue**

Research investigation appears to suggest (p. 48) that the conventional oil-quench-and-draw treatment is wrong if optimum creep properties are to be developed. . . . By using a molybdenum steel for two welded reaction chambers (p. 51) it was possible to reduce shell thickness from 3 1/32 to 1 13/16 inches. . . . A power truck at a stamping plant (p. 54) frees the operators of handling work, resulting in less fatigue, greater production and a better safety record. . . . An increasing quantity of porcelain enameled sheet is being consumed (p. 58) in the fabrication of store fronts. . . . An authority on gas-fired baking and drying ovens (p. 59) considers factors for low-cost operation. He sets forth data for calculating the heat requirements of recirculating ovens.

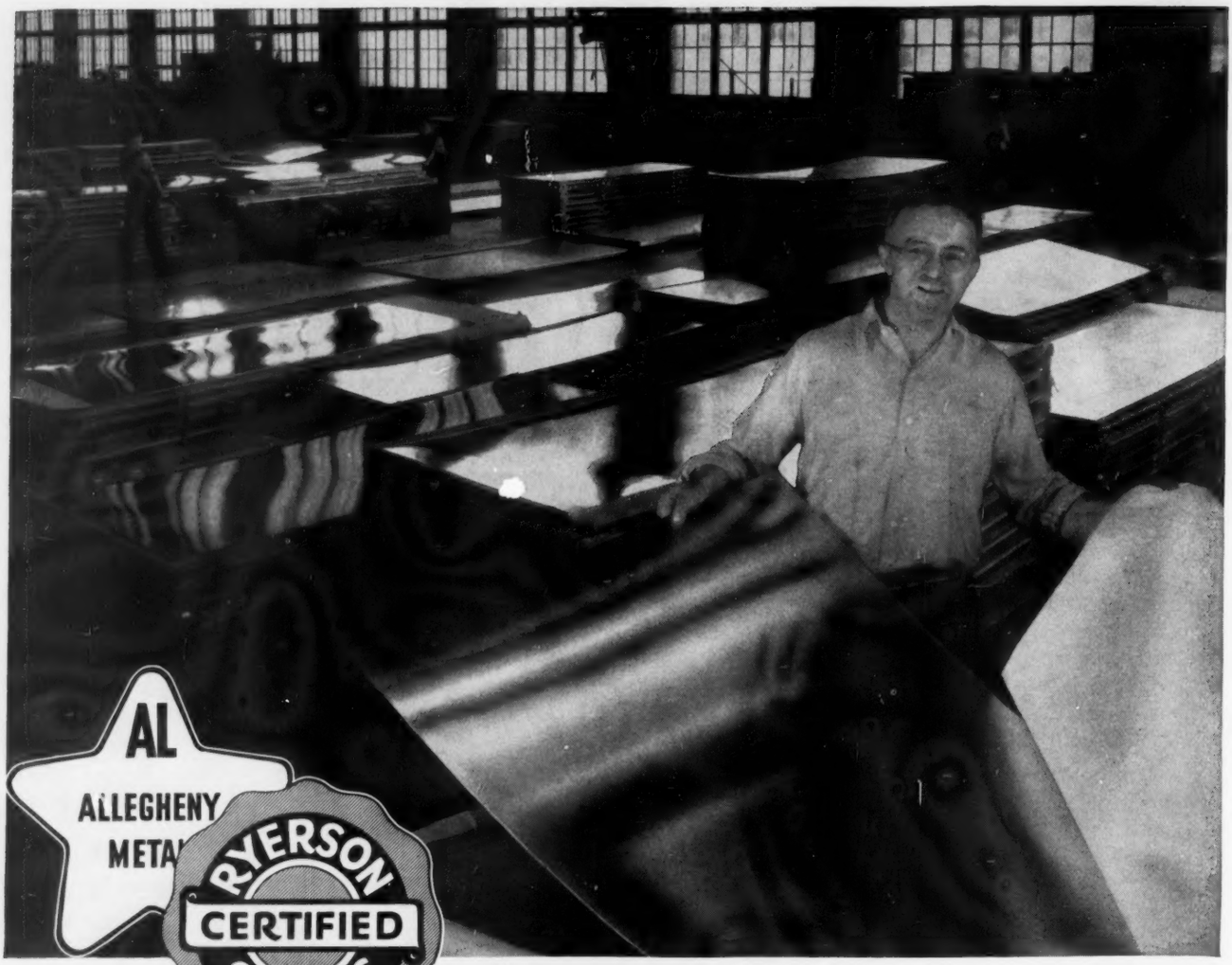
• • •

**Training Vital Need**

A new method is available for reconstructing corroded steel stacks. Heat-resistant cement (p. 64) is applied to the stack surface with a gun, thus building a self-supporting concrete chimney which will be serviceable after failure of the steel. . . . By an intricate welding sequence and stagger system developed in Canada, passenger car sheathing (p. 66) is arc welded in place with minimum bulging and distortion. All-welded bolsters are assembled in a rotatable jig which permits downhand fillet welding. . . . Tennessee Coal, Iron & Railroad Co.'s new continuous weighing installation (p. 72) comprises eight machines which will blend iron ore from 32 storage silos at rates up to 4000 tons an hour. . . . Apprentice training is a vital need (p. 74) under present disturbed world conditions.

*To all a Merry Christmas!*

E C Kreutzberg

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**RYERSON STEEL-SERVICE**

# Machine Tool Industry Thinks Ahead In Current Modernization

**STEEL'S Survey Proves Long Range Planning Is General; that 1939-40 Building and Equipment Programs Are Dictated by Basic Economic and Technological Changes—Not by War Boom Psychology; and that Vivid Recollections of 1914-18 and the Aftermath Preclude the Possibility of Unreasonable Expansion Now**

■ AMERICAN machine tool builders today not only are giving serious thought to the future of their industry—they are doing many constructive things to prepare themselves properly for this future. In this respect the course being pursued today is considerably more sensible than that which was followed during the 1914-18 period.

Vivid recollections of conditions subsequent to the World War are fresh in the minds of many men who still are in key positions in the machine tool business, even after 20 years.

After the World War was over, this industry found itself greatly over-expanded as far as floor space was concerned, but it did not find itself particularly well equipped to meet post war demands for efficiency, accuracy and finishr.

### Factors Behind Present Rush

After liquidating machinery useful only for wartime production, that which was left did not represent a very impressive array with which to meet stiff peacetime competition. This equipment—if not prematurely worn out—was far more obsolete than its age might indicate. Generally speaking, the equipment situation in the machine tool industry after the World War represented a more serious condition than did excess floor space, even though the latter condition was more commonly recognized.

Now the rush is on again, due in part to another and thus far different kind of European war. To a larger degree than commonly realized, however, this present rush seems to be due to widespread uncorking of domestic demand for machine tools for belated replacement and for necessary expansion of normal manufacturing activities in the United States. In this matter of replacements, the machine tool industry itself now is to an almost unprecedented degree one of its own best customers.

Due among other things to the sudden cancellation of its national show in Cleveland immediately following the outbreak of the present war in Europe, considerable public attention has been focused lately upon the machine tool industry. As is perhaps natural in the case of an industry whose products and operations and peculiarities are not too well understood or appreciated by the general public, a considerable amount of rather sensational misinformation just now is being noised around. Typical of this are the startling stories of "expansion programs."

There is nothing particularly sensational or startling about the present situation, once the true facts are known and understood. Rather, the situation is more healthy and more reassuring as to the future, than it has been in many a long day. Certainly it can in no way be compared to the hectic conditions of the 1914-18 era when all thoughts seemed to be focused greedily upon the heavily ladened industrial banquet table with no thoughts as to who eventually was going to pay the bills and wash up the dishes.

### Tower of Babel Not Being Rebuilt

To tear aside the veil of rumor and thus expose the true and essentially healthy condition of things, STEEL has obtained from 35 well-known companies in the machine tool industry frank statements as to their active plans as to the present and the future insofar as plant, equipment and production policies are concerned. On this basis, we will let the industry speak for itself.

"For ourselves," says Acme Machinery Co., Cleveland, "please be advised that we have eliminated

■ **A roomy, well-lighted erecting shop with modern lifting, painting and shipping facilities, now is recognized as a virtual necessity by American machine tool builders. Photo courtesy Monarch Machine Tool Co., Sidney, O.**

about 100 obsolete machines, and have re-arranged the balance to give better progress to material going through our shop — thus eliminating lost time in handling. We also have a number of new machines on order."

Abrasive Machine Tool Co., East Providence, R. I., reports as follows: "Being a relatively young concern in this business, our equipment probably is not as old on the average as that of many of the longer established machine shops. We have come to the point, however, where the greatly increased efficiency of the more modern tools make it necessary to arrange for some replacements. The older models will not stand today's pace. Some of them will still do a good job as far as quality is concerned but you cannot crowd them and obtain the same quality. Machine tool builders are now practicing what they preach—by putting in modern equipment themselves."

**Steps Up Equipment Purchases**

Blanchard Machine Co., Cambridge, Mass., is pursuing the following policy: "We have stepped up our purchases of machine tools this year considerably above our normal annual rate, which is 10 per cent of replacement cost. A few of the older machines have been released but in general—if still serviceable—we will keep them in operation or ready for operation until the present rush is past. We are not adding to building space at present, as we have been able by some re-arrangement to make more effective use of present available space."

Bryant Chucking Grinder Co., Springfield, Vt., pictures its situation thus: "We have been very busy for the last two or three years, but as soon as the European war broke out we received quite a large volume of domestic orders in addition to some from foreign countries. In order to take care of increased requirements we decided to build an addition at once. This steel and brick building—now under construction by the Austin Co.—will add 14,000 square feet to our plant.

"We also have some new equipment on order, but since our greatest need is for additional assembly space, we are planning to re-arrange our present equipment—much of which has been purchased for replacement in the last two or three years—so as to give the required space to the various departments which need it."

Columbus Die, Tool & Machine Co., Columbus, O., reports that while in 1937 quite a lot of new equipment was purchased, nothing further was bought until October, 1939, when about $20,000 worth of new machine tools were ordered. "About one-third of this amount," the company says, "represents replacement of old equipment, while the balance is for additional equipment."

Cone Automatic Machine Co., Inc., Windsor, Vt., makes the following statement: "At the present time we have the largest backlog of orders in the history of the company, but we are not going to increase our floor space by one single square foot. We will, however, make every effort to use our present floor space to better advantage—by re-arranging machinery, by the purchase of new equipment which will speed up production, and by re-arranging our working schedules so as to employ our workmen to the best possible advantage."

Continental Machines, Inc., explains that for the past three years it has been carrying out a program of expansion, and that during that period its production has increased three-fold. The development of this program has been as follows: "First we isolated the inspection and assembly departments from the manufacturing departments. The main assembly line was laid out to maintain a steady production rate without necessitating the speeding up of any one section of the line.

"This original assembly line was again sub-divided into unit assembly departments in which sub-assemblies were completed as units, thereby making for closer production and inspection control of the entire machine. The subdivision of assemblies thus split up, we incorporated an inspection system whereby a three-way of finished parts, finished sub-assemblies and final inspection were correlated. At this point we had trebled our floor space and had doubled production rate without greatly increasing our production machinery.

**Uses Machines of Own Make**

"Our machinery purchases in the last four years have included standard type milling machines, planers, surface and cylindrical grinders, engine lathes, turret lathes and standard drilling equipment. Five of our own Doall machines are used in the production department.

"With the increase of production facilities in the machine shop we made a second division, this time separating the equipment used on tools, dies and fixtures. This department was moved into a new building having continuous 10-foot windows on all four sides. In setting up this division we first completely rebuilt all machinery which was moved and replaced that which was obsolete.

"And finally, with the advent of larger, heavy Doall machines, we have added a third machine shop to handle the heavier work such as large planer jobs, large boring and drilling, heavy grinding and other operations not suitable for the equipment in our main plant. All the machinery in this third shop has been purchased within the past four years. Our objective at all times is to have a modern plant adapted to the needs of our workers."

Cushman Chuck Co., Hartford, Conn., says: "Our own policy has been in the past to keep our manufacturing space within as small an area as possible without endangering efficiency in production. In recent years we have made no addition to our buildings except for storage purposes but there has been a continuing improvement of equipment.

"During the past two years we have re-arranged the alignment of our machinery to a considerable extent so as to secure more effective use of floor space and have replaced certain equipment with improved types of machines. Equipment is only added when it will result in improved quality of our product rather than for the purpose of stepping up production."

In the case of Davis Keyseater Co., Rochester, N. Y., the situation in brief is this: "We are adding additional shop equipment to the amount of about $18,000, also increasing shop floor space by 1500 square feet."

**Entire Plant Overhauled**

Defiance Machine Works, Inc., Defiance, O., which became a subsidiary of Toledo Scale last December, has been carrying on a very extensive modernization program. Here is a brief summary of some of the things covered.

*Foundry*—10,000 square feet addition; removal of cleaning room and offices to new addition allowing expansion of molding floor; installation of new Whiting cupola, Pangborn sand blast room, sand conditioner, sand mixer, core sand mixer, roll over machines and molding machines; complete remodeling of pattern shop; installation of a full chemical, physical and sand testing laboratory.

*Factory* — Complete re-arrangement which will allow the machine departments a wide area through the center of the plant with the main assembly floor on one side and the sub-assembly floor, factory office and stock room on the other side. Tool room and gear department remain on the second floor. This was accomplished somewhat as follows: Milling machines moved from second floor to first floor; gear department from second floor of

building No. 2 to second floor of building No. 3 with stock room moved from second floor of building No. 2 to main floor of building No. 5; new superintendent's office and stock control and routing offices adjacent to the stock room. Grinder department was moved to allow expansion of boring mill department. Lathe department was moved from an isolated part of the shop to the center area between the stock room and the assembly floor.

*Offices*—The old office building is being abandoned. New modern offices are now under construction in the second floor of building No. 2, the space previously occupied by the stock room and gear department.

Ex-Cell-O Corp., Detroit, gives this information: "During the past year, we have added better than 22,000 square feet to our buildings, which makes a total of 220,000 square feet of floor space. With reference to new equipment, we have purchased over $250,000 worth of machine tools this year.

"Our plant has been modernized considerably and has been rearranged more efficiently to take care of our production. This additional expansion of buildings and purchase of new equipment has enabled us to give employment to more people. At present we have 1660 employes on our payroll, as compared with 1070 in 1938."

Farrel-Birmingham Co., Inc., reports from its executive office in Ansonia, Conn., as follows: "We have completed within the last year the revamping of our Ansonia foundry which included the building of a new cleaning room, a new sand-handling building and the installation of a complete modern sand-conditioning unit, shake-out, cranes and a new molding machine. This was not an expansion program but the modernization of an old plant.

"The Ansonia machine shop has purchased twelve new machine tools, the roll shop has purchased four new machine tools, and the Buffalo machine shop has been authorized to purchase eight new machine tools. These are all for replacement of old equipment and are not part of an expansion program.

"As a result of this modernization program and the addition of new machines we expect to obtain greater efficiency which naturally will result in some increase in output."

### Non-Productive Space Salvaged

Fellows Gear Shaper Co., Springfield, Vt., says: "We are not adding to the plant in the same manner that some of the other local concerns are; but we are using every available space within the area we possess. For instance, we have eliminated two light wells and thus have added over a thousand square feet of floor space. We have also filled in between two wings of the plant and this has added over 2800 square feet of space.

"In addition we have purchased the local Gilman Plant, which has a floor space of approximately 15,840 square feet. This particular plant is at this time being completely renovated and will be used largely for assembling purposes on several of our smaller machines. In all we have added approximately 19,824 square feet to our manufacturing floor space.

"In addition to the increased space now available, we are also making a complete re-arrangement of our manufacturing facilities so as to expedite production, and are filling in the gaps with new machine tools and, of course, replacing equipment that is no longer capable of meeting present-day requirements."

"During the past year and including this year," reports Fosdick Machine Tool Co., Cincinnati, "we have made no effort to expand our plant but are replacing all of our old machine tool equipment. In doing this, we have re-arranged our entire shop and, with the new equipment already installed and the equipment on order, we should be able to increase our production 50 per cent, with the same amount of floor space.

### Cautious About Building

"We have had in mind the building of an addition to the plant for housing our steel and cast iron storage and the paint department. We might go through with this plan if business continues as it has in the past two or three months. We also contemplate a new office building, which would take care of our office and engineering department and a new recreation room for our employes. It is impossible to say whether or not we will go through with this latter plan."

George Gorton Machine Co., Racine, Wis., announces this program: "We are now building a fire-proof assembly addition, size 60 feet by 180 feet. We are also building a new boiler house and have enlarged our parking facilities. During the past several years we have made extensive replacements of old equipment and have several new machines on order at this writing."

Gould & Eberhardt, Newark, N. J., already housed in a modern plant of approximately 3 acres all on one floor, does not contemplate any enlargement—it being possible to take care of added output through multiple shifts.

Hall Planetary Co., Philadelphia, is meeting the current situation in this way: "We are trying to solve the problem of building more Planetaries without expanding our plant, by getting as many parts

(*Please turn to Page* 68)

## Swinging Roofs Speed Furnace Charging

■ **Crane Co., Chicago, has installed swinging roofs on its 5 and 7-ton melting furnaces to permit bulk charging by crane. This reduces charging time from 40 to 3 minutes, increases output, reduces excessive effort required in hand loading. Company also has installed 600, 1000 and 2000-pound high-frequency induction furnaces with melting capacity of 10 tons daily. New molding machines, conveyors and rearrangement of old equipment provide faster handling, more efficient operation**

# Machine Tool Outlook Bright

■ OUTLOOK for machine tool industry for at least the first quarter is more satisfactory than at any time since pre-depression days, Wendell E. Whipp, president, Monarch Machine Tool Co., Sidney, O., states in company's magazine, *Monarch Shop Talk.*

"In the case of our own company," Whipp says, "business already on the books will carry us well into the new year, and this situation is, I believe, the case to a greater or less extent throughout the machine tool industry."

Mr. Whipp said he personally believed the volume of machine tool sales and production will continue at a high level for some months.

This belief was based chiefly on two factors—strong, varied domestic demand and our defense needs.

"In short, even if the foreign market for machine tools, which is now large, should suddenly decline—and in this time of bewildering developments in Europe the foreign demand for machine tools is, to say the least, unpredictable—the need for machine tools in our own country should still support a comparatively high rate of operations in the industry, extending well into the new year.

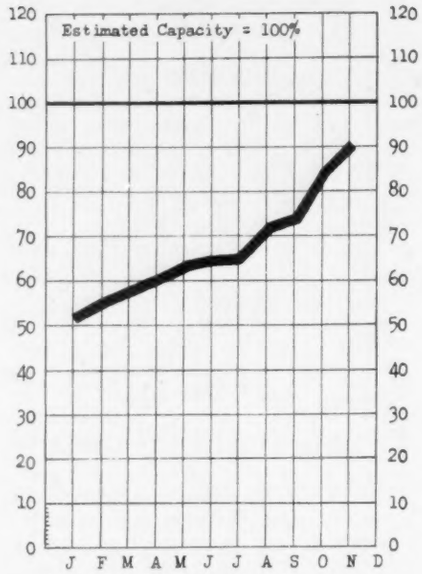
"Trade figures show that increased employment is being reflected in increased public demand for products and devices which are essential to our modern standard of living—household appliances, homes, clothing, automobiles, refrigerators, and the like. When manufacturers of these goods are busy they are good buyers of machine tools . . .

"As to national defense—the terror of power politics in Europe and the danger of war have awakened our democracy to its needs in this vital direction. It is certainly probable that the American people will endorse a plan for a better equipped army, navy and air force. This program will require the services of machine tools."

## Awarded Blast Furnace Gas Scrubbing Unit

■ Bethlehem Steel Co. has awarded a contract to Peabody Engineering Corp., New York, for a blast furnace gas scrubbing installation. It will be located in the top of a tower washer through which gas passes before entering an electrical precipitator. This will be the third Peabody scrubbing unit to be installed by Bethlehem.

### Toolbuilders Active




**■ Machine tool industry operated at 91.2 per cent of estimated capacity in November, according to National Machine Tool Builders' association, Cleveland. November rate represents a 6.6 per cent increase over that for October, 84.9 per cent. Operations have shown an increase in each successive month this year**

## Nazis Confiscate Thyssen's Property

■ German government last week officially confirmed confiscation of the steel plants and other properties of Dr. Fritz Thyssen, former No. 1 German industrialist, as reported in STEEL, Nov. 27, page 17. Dr. Thyssen last September was forced to leave Germany, going to Switzerland, as result of his opposition to Hitler, to the Nazi war policy and the change in general German policy. Dr. Thyssen had been one of Hitler's earliest supporters, helped him become chancellor.

In a cable to STEEL recently, Dr. Thyssen said he would not retire from German industry.

## Gear Sales Lower

■ November gear sales were 10.6 below those for October, but 75 per cent higher than in November, 1938, according to the American Gear Manufacturers association, Wilkinsburg, Pa. Eleven months' sales were 36 per cent higher than for comparable period last year.

Association's index dropped to 126, compared with 141 in October, and 72 in November, 1938. October figure was highest since January, 1937.

# Canada Prepares For War Orders

*TORONTO, ONT.*

■ ANTICIPATING a sharp increase in new business, Canadian industry is putting plants in shape for war contracts on a large scale. Dominion Steel & Coal Corp., Sydney, N. S., has maintained plant operations on a capacity basis, and prospects are favorable for continuation of this rate well into 1940. Since outbreak of war, officials state, there has been a sharp increase in domestic orders for steel and 100 per cent operations have been required to keep pace with demand. A large backlog, which seems assured for duration of the war, has been created on demand from Great Britain. This includes rods, billets, and various finished and semifinished materials, as well as iron ore from the company's Wabana, N. F., mines.

H. G. Hilton, vice president, Steel Co. of Canada Ltd., Hamilton, Ont., stated that plant extensions costing $1,500,000 have been undertaken since war was declared. Included are an additional 150-ton open-hearth furnace adding approximately 100,000 tons annually to the steel producing capacity, and expected to be ready by the first of the year; additional soaking pits and extensions at the sheet mill to facilitate shipment.

Additions also are being made to various wire mills to increase production capacity.

### Aircraft Company To Build

Shareholders of Cub Aircraft Corp. Ltd., Hamilton, will be asked to approve a by-law to increase the company's capital stock from 80,000 to 500,000 common shares. This increase is necessary to provide capital for proposed plant additions. R. L. Gibson, president, states: "During the past few months, and especially since declaration of war, it has been brought to the notice of directors that in order to compete successfully for aircraft business it will be necessary to increase the capital for the purpose of building and equipping a larger aircraft factory."

Noranda Mines Ltd., Royal Bank building, Toronto, has acquired a half interest in Wabi Iron Works Ltd., Noranda, Que. J. R. Bradfield, representing Noranda Mines, will be added to the latter's board of directors. H. L. Roscoe, general manager of Noranda Mines, stated the Wabi foundry is the logical outlet for large quantities of scrap steel and iron which accumulate at the mine. Supplies will be assured in the event of protracted war. J. McKay-

Clements, president of the Wabi companies at New Liskeard, Ont., and Noranda stated the arrangement affected the latter foundry only.

From Winnipeg word is received that farmers in the Prairie provinces are buying larger quantities of agricultural implements for spring delivery. Manufacturers of such implements in the United States, to compete with Canadian companies, are accepting orders on a basis of payment in Canadian funds. Collections this fall have been better than at any time since 1916.

A number of important British orders for war materials were placed during the past week, according to word from Ottawa, Ont. Details are not yet available, with the exception of a contract awarded Massey-Harris Co., Toronto, for shells and mine parts. No official announcement has been made and company officials are restrained by war regulations from releasing information. It is asserted, however, that certain firms have either received definite British contracts, or are assured orders. In addition to the Massey-Harris awards it is stated that Dominion Bridge Co., will receive a contract estimated at $4,000,000. Another company said to have received war business is Robert Mitchell Co. Ltd., Montreal, Que., for production of aircraft parts.

### Additional Contracts Placed

Canadian war supply board has placed additional contracts totaling $2,800,000, according to Transportation Minister Howe, responsible for war supply purchases for the dominion government. This brings total allotted for war purposes to almost $48,000,000 since the outbreak of hostilities last September, but does not include $25,000,000 designated for railroad equipment. All orders placed in the latest contracts were awarded to Canadian firms, with two exceptions—$500,000 to Britain for purchase of ordnance required for Canadian defense and $280,000 placed with manufacturers in United States for special aviation and optical supplies, not obtainable in Canada.

Marine equipment orders were placed with Burrard Dry Dock Co. Ltd., Vancouver, B. C., at $48,000; Halifax Shipyards Ltd., Halifax, N. S., $42,500. Airplane supplies were placed with Noorduyn Aviation Ltd., $63,500; Irvin Air Chute Co. Ltd., $308,300; British Aeroplane Engines Ltd., Montreal, $91,935 and MacDonald Bros. Aircraft Ltd., Ottawa, $7300. Machinery orders were placed with John Bertram & Sons Ltd., Montreal, $12,714 and the A. R. Williams Co. Ltd., Montreal, $5125.

Outbreak of war in Europe has been responsible for a sharp jump in Canada's foreign trade. Almost three-quarters of Canada's October imports came from the United States. Total imports in October were $79,053,266 of which $60,444,,-240 came from United States. Imports from all countries in October, 1938, totaled $63,908,940, the United States supplying $38,488,813. Iron and its products showed the greatest increase, advancing from $12,-579,000 in October, 1938 to $21,575,-000 for October 1939. Gains also were recorded in imported automobiles and parts, farm implements, machinery, plates, sheets and other rolling mill products.

Canada's commodity export trade during November continued advancing. Value of exports was $97,238,850 compared with $85,979,453 in November, 1938. Total for eleven months this year was $823,980,256 against $768,696,252 for corresponding 1938 period. Principal domestic commodities in November were wheat, $14,-842,030, up from $12,727,305 a year ago; partially manufactured copper, $5,480,006, against $5,673,318; unfinished nickel, $5,115,045 against $5,646,887 a year ago. Automobiles and automobile parts totaled $2,-124,889, compared with $1,242,907 a year ago.

## District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

| | Week ended Dec. 16 | Change | Same week 1938 | Same week 1937 |
|---|---|---|---|---|
| Pittsburgh ... | 93 | — 1 | 41 | 19 |
| Chicago ..... | 92.5 | —1.5 | 60 | 24 |
| Eastern Pa... | 88 | None | 37 | 29 |
| Youngstown . | 93 | None | 56 | 30 |
| Wheeling .... | 85 | — 8 | 62 | 24 |
| Cleveland .... | 90 | + .5 | 59 | 36 |
| Buffalo ..... | 90 | None | 44 | 16 |
| Birmingham .. | 94 | None | 82 | 45 |
| New England. | 93 | + 3 | 70 | 30 |
| Cincinnati ... | 69 | —11 | 75 | 54 |
| St. Louis .... | 85 | + 2 | 51.5 | 16 |
| Detroit ..... | 94 | — 2 | 89 | 52 |
| Average ....92.5 | | —1.5 | 58 | 27 |

### U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)
(Tons)

| | 1939 | 1938 | 1937 | 1936 |
|---|---|---|---|---|
| Jan. | 789,305 | 518,322 | 1,149,918 | 721,414 |
| Feb. | 677,994 | 474,723 | 1,133,724 | 676,315 |
| March | 767,910 | 572,199 | 1,414,399 | 783,552 |
| April | 701,459 | 501,972 | 1,343,644 | 979,907 |
| May | 723,165 | 465,081 | 1,304,039 | 984,097 |
| June | 733,433 | 478,057 | 1,268,550 | 886,065 |
| July | 676,309 | 441,570 | 1,186,752 | 950,851 |
| Aug. | 803,822 | 558,634 | 1,107,858 | 823,703 |
| Sept. | 985,050 | 577,666 | 1,047,962 | 961,803 |
| Oct. | 1,218,545 | 663,287 | 792,310 | 1,007,417 |
| Nov. | 1,270,894 | 679,653 | 587,241 | 882,643 |
| Dec. | ..... | 694,204 | 489,070 | 1,067,365 |
| Adj.* | ..... | ‡30,381 | †77,113 | †40,859 |
| Total | ..... | 6,655,749 | 12,748,354 | 10,784,273 |

*Yearly adjustment. †Deduction. ‡Increase.

# PRODUCTION

### REPAIRS BRING OPERATING RATE DOWN TO 92.5%

■ STEELWORKS operations last week declined 1.5 points to 92.5 per cent, mainly because of repairs. Five districts were at lower rates, three at higher and four were unchanged. A year ago the rate was 58 per cent; two years ago 27 per cent.

**Youngstown, O.**—Held at 93 per cent, with 69 open hearths and three bessemers active. Schedule for this week calls for the same rate.

**Pittsburgh**—Down 1 point to 93 per cent as curtailment for repairs slowed down several producers, others making slight gains. Jones & Laughlin Steel Corp. will blow in another blast furnace soon.

**Wheeling**—Reduction of 8 points to 85 per cent resulted from repair work, part resumption being expected this week.

**Chicago**—Off 1.5 points to 92.5 per cent, two producers curtailing slightly, more than offsetting improvements by another. Three plants operated at unchanged rate.

**Central Eastern Seaboard**—Unchanged at 88 per cent. One plant dropped an open hearth but another increased output to accumulate ingots preparatory to closing open-hearth department Dec. 23.

**Buffalo**—Steady at 90 per cent, no change being made by any producer.

**New England**—Advanced 3 points to 93 per cent, with resumption at 100 per cent expected soon.

**St. Louis**—Shifts in activity resulted in an advance of 2 points to 85 per cent.

**Birmingham, Ala.**—Held at 94 per cent, which has been continuous since the end of October.

**Detroit**—Off 2 points to 94 per cent.

**Cincinnati**—Dropped 11 points to 69 per cent, the result of temporary shutdowns for repairs. An increase is scheduled this week.

**Cleveland**—Recovered ½-point to 90 per cent but will decline several points this week.

### U. S. STEEL SHIMENTS INCREASE 4 PER CENT

■ Finished steel shipments by the United States Steel Corp. in November totaled 1,270,894 tons, the largest monthly tonnage since May 1937, with 1,304,039 tons. The November figure was 52,349 tons, 4 per cent larger than October shipments of 1,218,545 tons and 87 per cent greater than 679,653 tons in November, 1938. For 11 months shipments amounted to 9,347,866 tons, compared with 5,931,164 tons in the corresponding period of 1938.

# Profit Held Vital To U. S. Defense

■ TODAY'S assurances of an adequate national defense are to no small extent founded on industry's continuing opportunity to earn the profits necessary to finance research, invention and development of better materials and processes. This declaration was by T. M. Girdler, chairman, Republic Steel Corp., Cleveland, speaking at a dinner honoring Maj. Gen. C. M. Wesson, chief of ordnance, United States army, in New York, Dec. 12. Dinner was sponsored by the New York post, Army Ordnance association.

"National defense in its modern definition is not a matter of manpower merely," he said. "It involves economic power. It involves machine power. It involves supplies of essential materials.

"America must be kept strong not only to protect itself in a world full of present perils, but to serve as a force for world stability and readjustment when peace comes."

Mr. Girdler noted the development of special steels for aircraft and other defense weapons, the progress in welded construction, and other technological developments since the World war.

**Steel Defensive Factor**

"Every phase of national defense is dependent on steel. The development of the steels to meet these requirements has meant time, patience and the expenditure of millions of dollars in peace-time research . . .

"They were financed out of the operating profits which American industry contrived to make, in the face of all the economic upheavals which have swept this country in the last 20 years. . . .

"The profit motivation—the desire and the opportunity to make a profit in the face of competition—has been the mainspring of progressive development of inventions and processes in this country since the nation began. . . .

"Now, lest I be misunderstood, there is one point which I wish to make doubly plain. When I speak of the necessity of maintaining the opportunity for profits, under the competitive system, I most emphatically am not referring to war profiteering."

Mr. Girdler recalled that during the World war steel prices were worked out in co-operation between the government and industry on levels far below those prevailing in the open market. The war industries board reported in 1919 that it was estimated this reduction meant a saving to the United States and the allied governments of approximately $3,000,000,000, "and in view of the fact that there was no legal authority for enforcing these requirements, we considered it a great achievement and a wonderful evidence of the patriotism of the steel manufacturers in this country."

# FINANCIAL

**MAKES $8,000,000 LOAN TO RETIRE OLD DEBENTURES**

■ AMERICAN Radiator & Standard Sanitary Corp., New York, has borrowed $8,000,000, as of Nov. 1, on promissory notes with maturities varying from one to ten years and interest rates ranging from 1½ to 2 5/8 per cent.

Proceeds of the loan were applied, together with other funds, to retirement, Nov. 1, of the entire $10,000,000 20-year 4½ per cent debentures of American Radiator Co. An aggregate of $500,000 principal matures Nov. 1 of each year 1940-48 inclusive, the balance Nov. 1, 1949.

♦

Hydraulic Press Mfg. Co., Mt. Gilead, O., has completed new capital financing. Twenty thousand shares 6 per cent cumulative convertible preferred and 40,000 shares of common were issued. Both issues were oversubscribed.

**DIVIDENDS DECLARED**

M. A. Hanna Co., Cleveland, 25 cents quarterly on common, payable Dec. 22 to record of Dec. 16. Same amount was paid Sept. 30.

Perfect Circle Co., Hagerstown, Ind., regular quarterly of 50 cents on 162,500 shares of common outstanding.

Noblitt-Sparks Industries Inc., Columbus, Ind., extra of 90 cents and regular quarterly of 60 cents on capital stock, both payable Dec. 28 to record of Dec. 18.

Cleveland Cliffs Iron Co., Cleveland, $2 on preferred stock, payable Dec. 21 to record of Dec. 15. Previous payment was $1, Oct. 31.

Midland Steel Products Co., Cleveland, regular of $2 on 8 per cent cumulative first preferred stock, payable Jan. 1 to record of Dec. 26. Also 50 cents per share on non-cumulative stock and $3.50 per share on common, both payable Dec. 28 to record of Dec. 26.

Perfect Circle Co., Hagerstown, Ind., 50 cents quarterly on 162,500 common, payable Jan. 2 to record of Dec. 15.

Mesta Machine Co., Pittsburgh, 50 cents on common, payable Jan. 2. Previous payment of 25 cents was made Oct. 2.

# Steel Wages in Supreme Court

■ GOVERNMENT attorneys filed a petition last Friday in the United States Supreme Court for a writ of certiorari to the court of appeals for District of Columbia in the Walsh-Healey minimum wage case.

Action follows decision in October by the district court of appeals that Secretary of Labor Perkins had exceeded her authority in determining minimum steel wages to be paid on government work. Decision was based on a suit brought by Lukens Steel Co., Coatesville, Pa., Alan Wood Steel Co., Conshohocken, Pa., South Chester Tube Co., Chester, Pa., and other small eastern steel companies after the labor department had established 62½ cents an hour as the minimum wage to be paid in eastern states. Wages were not put into effect because the court of appeals restrained the labor department.

Counsel for small steel companies will be given until Jan. 4 to file an answer to the petition. Chances are the Supreme Court will act on the writ, which would call up the records of the court of appeals for review, by the middle of January or soon thereafter.

## New Record Established In Scrap Consumption

■ Steel mills, blast furnaces and foundries consumed 4,025,000 gross tons of iron and steel scrap in November in the production of new iron and steel, setting a new high record, according to the Institute of Scrap Iron and Steel Inc., New York. This compares with 3,974,000 tons in October, the previous record month, and 2,732,000 tons in November, 1938.

In the first 11 months of 1939, total of all scrap consumed domestically was 31,201,000 tons, compared with 19,117,000 tons in the corresponding period of 1938, the institute estimates.

Exports of scrap in October totaled 336,775 tons, and for ten months of this year 3,098,369 tons. Ratio of domestic consumption to exports continues a little over 11 to 1.

---

■ October domestic production of manganese ore containing 35 per cent or more manganese was 3400 long tons. Shipments, according to the bureau of mines, totaled 3200 tons. Producers' stocks Oct. 1 were 1300 tons, at end of the month, 1600 tons.

# What's New at Pittsburgh . . .

By R. L. HARTFORD
Pittsburgh Editor, STEEL

■ OTHER industries besides steel have followed the policy of stabilizing prices. In a statement here, H. S. Wherrett, president, Pittsburgh Plate Glass Co., said: "We, along with other large industries, are refusing to take advantage of improving business conditions with undue advances in the price of our products. As long as raw material prices, taxes and labor rates are kept within reasonable bounds price advances on finished products will be resisted.

"Runaway prices, which tend to dry up public purchasing power, can be checked or restrained by sincere efforts of business, labor and the government in contributing to the stability of economic conditions. These policies should aid in building a lasting prosperity."

Mr. Wherrett said that heat-treated, tempered glass, which has several times the strength of ordinary glass, is competing with many non-glass products in applications where structural strength is required. Some of these uses are paneling, partitions, stair steps and railings.

**Three New Mills Ordered**

United Engineering & Foundry Co. is building a 4-high cold rolling mill for wide sheet production in the plant of Dow Chemical Co., Midland, Mich. Dow will use this in production of Dowmetal, light aluminum-magnesium alloy. The sheets heretofore have been rolled on 2-high equipment.

Another new order received is from Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont., for a 3-high breakdown sheet mill, engineered by Lewis Foundry & Machine division, Blaw-Knox Co. The mill will be built by Canada Iron Foundries Ltd., Montreal, with which the Lewis company has a manufacturing arrangement. Lewis is building at its plant here a similar mill, recently ordered by an American steel company.

♦

Employers' association of Pittsburgh has released employment figures for 63 representative firms here during October. Total employes on the payrolls has moved up three points from the preceding month, to 75.9 per cent. Total number on the payrolls has moved up about 1500, to 37,614. Average work week remains constant at 40.3 hours, while the percentage of labor turnover dropped from 1.15 to 0.91. Totals for the month are still far below 1937, however, both in man-hours worked and percentage of normal working force on the payroll. The companies include structural shops, foundries and machine shops, and miscellaneous industries.

♦

One interesting sidelight on the delivery situation in the steel markets developed here last week when trucks were barred from the outbound lane of Bigelow boulevard, main artery which has been closed many months for rebuilding. Open this week to other vehicles, the new road is closed to trucks because the necessary steel beams to support an overhead railway could not be purchased, according to city officials. In order to support the railway, smaller beams with cross braces were substituted, which hang so low as to prevent passage of trucks. The heavier beams have been on order for some time, but delivery has been delayed due to pressure of other orders.

## Court Upholds Wisconsin Labor Board Over NLRB

■ Wisconsin's labor relations board, established under the state law enacted last spring, won its first court test in a jurisdictional dispute with the national labor relations board last week.

Circuit Judge Otto H. Breidenbach upheld legality of an order by the state board July 13 for a CIO union to cease mass picketing at the Allen-Bradley Co. plant, Milwaukee, even though the order conflicted with the procedure of the national board. The latter was conducting a separate investigation of the union's charge of company interference with employes' rights to organize.

Court ruled settlement of strike did not end the issue as to the authority of the state board to enforce its orders. It denied the contention of CIO counsel that the Wisconsin act is void because it attempts to regulate the same employer-employe relations covered by federal law.

"The national act does not purport to exclude states from the regulation of the field of labor relations," the court ruled.

## Welding Helps Build Huge Steel Pipe Line

■ Welding is playing an important part in construction of a new pipeline, largest of its kind ever built, which eventually will carry 300,000,000 gallons of water daily to Boston's metropolitan water district.

Two sizes of pipe are being fabricated by welding, one section 12½ feet in diameter and 12 feet long, and the other 11½ feet in diameter and 16 feet long. Steel cylinders and reinforcing assemblies weigh 45 to 50 tons when sheathed and lined with reinforced concrete.

When completed in 1940 the pressure aqueduct will be 17½ miles long, connecting Wachusett reservoir with a distributing point on the banks of the Charles river in greater Boston. Fabrication of steel cylinders and reinforcement assemblies for the pipe is being made by the American Concrete & Steel Pipe Co., under sub-contract to the Lock Joint Pipe Co., Ampere, N. J.

**Seams Automatically Welded**

In fabricating the steel sections, which are later covered with concrete, steel plates are tacked-welded together to hold them in position for seam welding. To insure maximum strength a special plant has been developed to automatically weld all seams. Current for this automatic welding is supplied by four General Electric 500-ampere transformer-type welding sets. The plates are then rolled to form a hollow cylinder and the final seam is welded. Bell and spigot rings are next welded in place and the section is then placed on a revolving mandrel and the reinforcing rings are welded on. Welding current for this work is supplied by motor generator arc welding equipment, including 20 General Electric units. The steel section, weighing from 5 to 10 tons, is then ready for concreting.

Approximately 7000 to 8000 feet of seam welds are made each day. This figure does not include the tack welding necessary to attach the reinforcement cages to the steel cylinder.

Photograph shows operators welding reinforcing rings to steel cylinder section.

# MEN OF INDUSTRY

■ J. R. GREGORY has been elected vice president and general manager of sales, Columbia Steel Co., San Francisco, subsidiary of United States Steel Corp. F. B. DeLong, manager of sales, Los Angeles district, has been named vice president in charge of sales in that district, and C. S. Conrad has been made assistant general manager of sales, manufacturing and construction accounts, succeeding Mr. Gregory. Harry E. Rogers, heretofore assistant manager of sales in charge of solicitation, succeeds Mr. Conrad as San Francisco district sales manager.

Associated with the steel industry since 1911, Mr. Gregory joined United States Steel Products Co. in 1926 and when the former Columbia Steel Corp. was acquired by the Steel corporation and merged with the Pacific coast department of United States Steel Products Co., he joined the new firm as assistant general manager of sales. Mr. DeLong joined the Los Angeles office of Columbia Steel in 1938 as manager of the tubular, alloy and stainless steel department. Mr. Conrad became affiliated with the Steel corporation in 1930 when he joined National Tube Co. Two years later he was transferred to the sales department of Columbia Steel where he was promoted to district manager of sales at San Francisco.

♦

Frederick J. Griffiths, recently appointed executive vice president, Copperweld Steel Co., Glassport, Pa., has been elected a director.

♦

M. R. Crossman has become associated with the machine and small tool division of Barber-Colman Co., Rockford, Ill., to handle advertising and publicity.

♦

George J. Connelly, heretofore division superintendent, Packard Motor Car Co., Detroit, has joined Covered Wagon Co., Mount Clemens, Mich., as production manager and chief engineer.

♦

Joseph L. McClane, general manager, Republic Aviation Corp., Farmingdale, L. I., has been elected vice president and a director. Thomas Davis, chief accountant, has been made secretary-treasurer.

♦

F. M. Ruggles, of Mullite Refractories Co., Shelton, Conn., has been named midwest sales representative for the company with headquarters in Chicago. His territory will include Illinois, Wisconsin and Missouri.

♦

Francis P. Garvan Jr. has been elected president, Chemical Foundation Inc., New York. Other officers are: Vice president, George J. Corbett; treasurer, William W. Buffum; secretary, Edward J. Muhs.

♦

Louis H. Brendel, assistant sales manager, Hancock valve division, Manning, Maxwell & Moore Inc., Bridgeport, Conn., has been promoted to assistant to C. H. Butterfield, general sales manager. His new duties will include supervision of sales promotion and jobber relations for the Ashcroft American Gauge division, Consolidated Safety Valve division, American Schaeffer & Budenberg Instrument division, and Hancock Valve division.

**Louis H. Brendel**

♦

H. J. Braun has been placed in charge of sales of the steel specialties division of Foote Bros. Gear & Machine Corp., Chicago, succeeding H. G. Hobbs.

♦

Robert R. Adams, a graduate in chemical engineering of Antioch college, recently joined the technical staff of Battelle Memorial institute, Columbus, O. He has been assigned to research in process metallurgy. Mr. Adams is a member, American Society for Metals.

♦

Guy W. Wilson, manager, transportation department, General Electric Co., has been elected a director and a member of the executive committee, Electric Railway Equipment Securities Corp., New York, which is jointly owned by J. G. Brill Co., Westinghouse Electric & Mfg. Co. and General Electric.

♦

Harry Kullberg has been named general master mechanic on the Mesabi iron range for Inter-State Iron Co., succeeding the late James Gross. He formerly was master mechanic at the Hill-Annex mine for Inter-State Iron.

♦

Angelow Hoffmann has been elected president, Milwaukee Sheet Metal Contractors association, which recently changed its name from Milwaukee Master Sheet Metal, Ventilating and Air Conditioning Contractors association. He succeeds Frank Kramer. Paul Biersach is executive secretary.

♦

Benjamin F. Fairless, president, United States Steel Corp., has been nominated for membership in the chamber of commerce of New York state. When formally elected, Mr. Fairless will be the third president of the Steel corporation since its organization to become a member of the nation's oldest chamber.

♦

R. L. Forney, assistant to the managing director, National Safety council, Chicago, has been appointed director of the council's industrial division, effective Jan. 1. He succeeds W. Dean Keefer, who has resigned to join the Lumbermens Mutual Casualty Co., Chicago, as assistant to the vice president in charge of safety engineering.

♦

Saunders Jones has been appointed sales manager of the Whiting, Ind., branch of Federated Metals division, American Smelting & Refining Co. He formerly was vice president and general sales manager of White Motor Co., Cleveland, and more recently vice president of White Motor's eastern region, with headquarters in New York.

♦

W. W. Watson, secretary, Oliver Iron Mining Co., has been elected treasurer, succeeding J. T. Melvin, retired. He will continue as secretary. A veteran of the United States Steel Corp., he began with the Minnesota Iron Co., now a subsidiary of the Oliver company, entering its employ as a clerk in the executive offices in Chicago in 1890.

♦

Carl H. Kindl has resigned as general manager, Delco Products division of General Motors Corp., Dayton, O. Frank H. Irelan, former production manager of Delco Products and the past several years general manager of the Delco Brake division, succeeds Mr. Kindl as general manager of Delco Products. B. A. Brown, factory manager of Delco Products, becomes general manager

of Delco Brake. Paul H. Rutherford present chief engineer at Delco Products, has been named factory manager. Edwin F. Rossman, assistant chief engineer, succeeds Mr. Rutherford as chief engineer, and Calvin J. Werner becomes assistant chief engineer.

♦

R. L. Johnstone has been appointed manager, Shaker division, Ajax Flexible Coupling Co., Westfield, N. Y.

♦

Douglas F. G. Eliot, for the past three years general commercial manager, Western Electric Co., New York, has been appointed general purchasing agent.

♦

H. B. Gay, third vice president, general sales manager, and a director, Electric Storage Battery Co., Philadelphia, retired Dec. 1, after 38 years active service with the company. He began his career in the sales department, and shortly thereafter was made manager of the Baltimore branch. In 1903 he advanced to managership of the Cleveland branch, which post he occupied 17 years. He then was transferred to Philadelphia, becoming general sales manager; in 1926 was elected fourth vice president and two years later, third vice president and a member of the board of directors.

♦

J. F. Hartlieb, executive vice president, Continental Can Co. Inc., New York, has been elected president. O. C. Huffman, heretofore president, has resigned that office and has been elected chairman of the executive committee of the board of directors. C. C. Conway has resigned his office as chairman of executive committee, but continues as chairman of the board. All three officers continue as directors.

♦

Clarence G. Stoll, since 1928 vice president in charge of operations, Western Electric Co., New York, has been elected president, succeeding Edgar S. Bloom, who will retire Dec. 31. Mr. Stoll has spent his entire business career of 36 years with Western Electric. Mr. Bloom will become director of purchases for the British Purchasing commission.

♦

Sidney Albert, Albert Bros., Waterbury, Conn., has been elected president, southern New England chapter, Institute of Scrap Iron and Steel Inc. Robert Jacob, Jacob Bros. Inc., Bridgeport, Conn., has been elected vice president, and S. Samuel Kasden, H. Kasden & Sons Inc., New Haven, Conn., re-elected secretary-treasurer.

♦

Charles R. Stevenson, Stevenson, Jordan & Harrison, New York, was

H. B. Gay

elected president, Association of Consulting Management Engineers, at its tenth annual session Nov. 30 in New York. George S. Armstrong, George S. Armstrong & Co. Inc., New York; Edwin G. Booz, Booz, Fry, Allen & Hamilton, Chicago, and Alonzo Flack, Emerson Engineers Inc., New York, were elected vice presidents; Elwood Horton, George S. Armstrong & Co. Inc., New York, treasurer, and Nathaniel W. Barnes, executive secretary, with headquarters at 347 Madison avenue, New York.

Serving with Messrs. Stevenson, Armstrong, Booz, and Flack on the board of directors will be E. O. Griffenhagen, Griffenhagen & Associates, Chicago; Robert W. Kent, Bigelow, Kent, Willard & Co., Boston, and George T. Trundle Jr., Trundle Engineering Co., Cleveland.

# DIED:

■ JOHN F. H. MILLER, former vice president and general manager, American Blower Co., Detroit, and since 1936 vice president, B. F. Sturtevant Co., Boston, Dec. 9 at Brookline, Mass. He had been president, National Association of Air Conditioning Unit Heating Manufacturing association, and of National Fan Manufacturers' association; a member, American Society of Mechanical Engineers, and American Society of Heating and Ventilating Engineers.

♦

Daniel W. Klauber, 82, president, A. Klauber & Sons Iron & Metal Co., St. Louis, in that city recently.

♦

Frank E. Hovorka, 64, until his retirement six months ago purchasing agent, Dingle-Clark Co., Cleveland, recently in that city.

♦

George Bertram Ambler, 66, vice president, Black Diamond Saw & Machine Works, Natick, Mass., Nov. 29.

♦

Edward C. Haker, 64, purchasing agent, Euclid Crane & Hoist Co., Euclid, O., Dec. 9 at his home in Mentor, O. He had been with the company 32 years.

♦

George L. Buck, 73, organizer, and president and treasurer, Racine Iron & Wire Works, Racine, Wis., until his retirement five years ago, in Racine, Dec. 6.

♦

Frank Ludlam, assistant secretary and assistant treasurer, International Nickel Co. Inc., New York, Dec. 8 in New York. Before joining International Nickel in March, 1903, he was associated with the former Carnegie Steel Co.

♦

Roy Carleton Bristol, 70, former president and chairman of the board, Parker Rust Proof Co., Detroit, in that city Dec. 11. At one time president of Alamo Gas Engine Co., Hillsdale, Mich., he joined the Parker company soon after it was organized and was president for five years until 1928 when he became chairman. Since his retirement he continued as vice president.

♦

Arthur O. Fox, 84, retired industrialist, in Madison, Wis., Dec. 11. In 1895 Mr. Fox founded the Northern Electric Mfg. Co., and pioneered in the construction of electric motors. The business was later purchased by General Electric Co. Mr. Fox then organized General Laboratories, retiring in 1929. He was a member, American Society of Electrical Engineers.

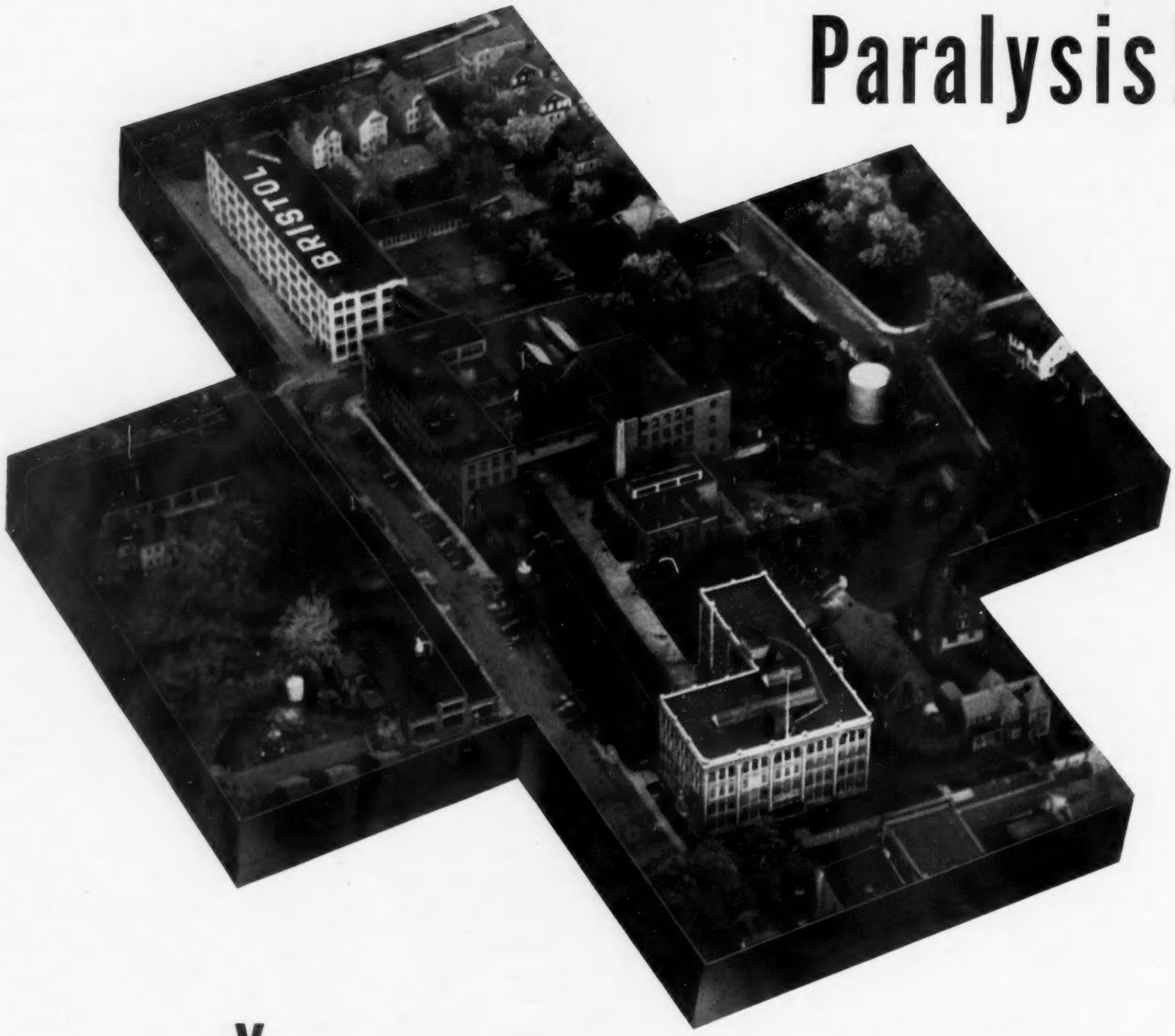
♦

James B. Tonking, 82, consulting metallurgical engineer, Dec. 7 in Dover, N. J. In 1881 Mr. Tonking was appointed superintendent, Irondale iron mine, Wharton, N. J., and subsequently was in charge of the Marquette mines of the Lackawanna Steel Co., Superior, Wis., the Mount Hope iron mine at Dover, and holdings of the New Jersey Zinc Co. in Sussex county.

♦

Fritz John Frank, 68, president, The Iron Age Publishing Co., Dec. 8 at the Northern Westchester hospital, Mt. Kisco, N. Y., after a short illness. Mr. Frank devoted a lifetime to the publishing business, the last 30 years of which were with *The Iron Age*. He was president of Associated Business Papers in 1923-24. Mr. Frank also was executive vice president of Chilton Co. and held directorships in Robbins Publishing Co., Business Publishers International Corp., Newton Falls Paper Co., and Savage Arms Co.

# Here's FIRST AID for Production Paralysis!




YOU can't afford to risk Production Paralysis by leaving your deliveries of springs to chance. You've got to **know** they'll be ready for your line when you want them.

Here at the Wallace Barnes Company, it is a matter of pride to deliver the goods. We can save you delivery worries on springs. May we try?

W-B
SPRINGS
SPRING STEEL
W-B

## Wallace Barnes Company

Division of Associated Spring Corporation - BRISTOL, CONNECTICUT

# Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

*WASHINGTON*

■ SINCE it started functioning in 1935, the national labor relations board has been criticized, called unfair and sometimes unconstitutional. Critics have been both business men and rival labor groups.

The special house committee's investigation of the board got off to a rousing start last week. Indications are that there will be changes of personnel within the board. There are also strong indications that it will be necessary to make some amendments to the labor act, probably at the next congressional session.

It will be recalled Donald Wakefield Smith was nominated last year to succeed himself on the board, but opposition was so great the President had to withdraw Smith's name. William L. Leiserson, who was substituted, was the first witness at hearings last week.

While he told the committee "I do not think that the act needs to be amended in any important respect," he was forced to admit through documentary evidence that he was opposing many things being done by the board.

Among other things, board's papers which were seized by the house committee showed definitely Mr. Leiserson had sought the removal of Nathan Witt, board secretary.

**Questions Ability**

Mr. Leiserson had stated to the board that in his opinion Mr. Witt should be ousted on the ground he was not qualified, either by training or experience. Mr. Leiserson stated that Mr. Witt's manner of handling certain cases made it impossible for Mr. Leiserson to have confidence in Mr. Witt's ability to perform his duties impartially as between various parties who appeared in cases before the board.

During Mr. Leiserson's testimony, a copy of a memorandum which Mr. Leiserson had sent to Chairman Madden in which Leiserson declared two cases before the board "already are in a mess because you persist in acting on the advice of the secretary and his amateur detectives," was introduced.

Lack of harmony in the board was indicated throughout the Leiserson testimony. A photostatic copy of a memorandum from Mr. Leiserson to his colleagues regarding one case read: "I do not recall agreeing to any such decision as this. If I authorized the preparation of this majority opinion, then the facts reported orally were different from the facts here recorded."

**Blames Opposition**

Mr. Leiserson in his direct statement to the committee said: "I think it would be a very serious error if congress were to change its declared labor relations policy and to amend the Wagner act in any vital respect."

It is difficult to understand, he told the committee, why the procedures of the labor relations act should be subject to such furious attacks as if they were new and unique in our system of law. Mr. Leiserson said that there are undoubtedly faults and weaknesses in the administration of the labor act "but it is a serious question if those who are opposing the law and demanding that it be revised are not more responsible for these defects than the board itself."

There is room for much improvement in the administrative methods of the board, Mr. Leiserson said, "but the act cannot be made to work altogether efficiently until the opposition to it and the attempts to weaken it by revisions, have ceased."

Joe Ozanic, president, Progressive Mine Workers of America, American Federation of Labor affiliate, told the committee 80,000 coal miners have been denied their rights under the Wagner act and forced to join the United Mine Workers of America, Congress of Industrial Organization affiliate.

"He said his union was organized in April, 1938, and a membership drive started, but "this great surge to freedom was stopped almost dead in its tracks by the national labor relations board's administration of the Wagner act. This act itself seemed clear and fair and desirable from labor's viewpoint; it was counted upon to give the workers that minimum of protection which they needed in order effectively to organize for collective bargaining. But the partisan administration of the act by biased board made the act a definite hindrance. It has deprived large numbers of mine workers of the right which, presumably, the law was to protect—the right to bargain collectively through representatives of their own choosing."

John P. Frey, president of the American Federation of Labor's metal trades department, recommended that congress prohibit labor unions from making direct contributions to any political party.

Mr. Frey termed "one of the most unfortunate incidents" in the history of labor unions was the loan made by the CIO-United Mine Workers to the Democratic party in 1936.

"Nothing," he said, "could be more destructive to organized labor than to have organized labor collect money for partisan politics."

**U. S. RESERVES RIGHT TO IMPORT FROM GERMANY**

Despite reduced industrial machinery shipments from Germany and the United Kingdom during September and October, these two countries remained the chief suppliers to the United States. Shipments from both countries were particularly low in September but recovered some in October.

Germany, our principal foreign machinery source, normally supplies from $300,000 to $400,000 worth of industrial machinery a month. In

September this fell to only $76,832, but in October rose to $125,491. Almost $45,000 of the October figure was accounted for by importation of four full-fashioned hosiery machines. Recent British decision to seize German exports may cut off almost half of our machinery imports and the principal source of our foreign textile and metalworking machinery purchases.

United Kingdom has been supplying the United States with average monthly machinery shipments of $175,000. September shipments were only $73,099, and the October figure was only $105,301.

The United States has reserved all its rights under international law to continue to buy German exports and has sent a notice to that effect to Great Britain.

The reservation, which is not in the nature of an open protest, was based on two points:

1. A question of principle under international law, according to which, in the World war, the United States, as long as it was neutral, refused to accept the British commercial blockade of Germany.

2. The United States really needs some of the articles it used to purchase in Germany. Among these are fine precision instruments, and authorities are interested in seeing that these continue to come to our shores.

Germany is filling export orders in preference to furnishing domestic requirements whenever possible in an effort to acquire foreign exchange and reduce balances of trade unfavorable to the Reich, according to a report from the office of the commercial attache, Berlin.

Despite Germany's need for railway equipment, an order was recently accepted for the delivery of 14 locomotives to Bulgaria.

Due to the clearing agreement between the two countries and the credits which Bulgaria is believed to have accumulated recently, the transaction will probably make but little exchange available to Germany.

Payment for the locomotives will, however, reduce the balance of trade between the two countries which is now in favor of Bulgaria.

### COMMITTEE FINDS DOWNWARD TENDENCY IN PRICES

Temporary national economic committee has made public its third summary of the price situation in accordance with the procedure recently established to maintain a watch on prices as requested by Mr. Roosevelt.

Composite average of wholesale commodity prices, the summary shows, continues to move in a narrow range; if anything a slight downward tendency exists. Committee says most striking feature of the behavior of the composite price averages since Sept. 16 has been the narrow range.

### CHAMBER OF COMMERCE OPPOSES TNEC PROPOSALS

Special committee of the United States chamber of commerce has taken issue with TNEC on its proposals for further control of industries by governmental agencies and advocated renewed emphasis of the chamber's policy respecting government controls.

The report of the committee which was named several months ago to make a study of competition regulation, was ordered by the chamber's board of directors to go before all member organizations for a referendum vote.

Specifically, the committee holds:

Any proposals that have for their object the control of industries by governmental agencies are not in the public interests.

Proposals of the economic committee that the rights of patentees in granting licenses be curtailed should not prevail.

Patent system should be maintained without impairment.

Proposal that "civic remedies" of a most extreme kind be added to injunctions obtained under the antitrust laws should be opposed. Existing remedies under the antitrust laws are ample, and can and should be enforced in an orderly manner.

Proposal the federal trade commission be authorized under section 7 of the Clayton act, now dealing only with acquisition of stock in a competitor when the acquisition causes substantial restraint of interstate commerce, to extend its powers to acquisition of assets, should be opposed, and that there should be preserved in the antitrust laws such rights as they now contain to permit reasonable arrangements to meet practical problems that are often vital to enterprises of smaller size and their owners.

### NONFERROUS SCRAP SURVEY PLANNED BY MINES BUREAU

Bureau of mines will make a survey of the nonferrous scrap situation similar to that made recently for iron and steel scrap. It is understood survey will be conducted in the same manner in which the iron and steel scrap survey was made.

Bureau also is making survey of domestic deposits of strategic minerals as provided in the strategic materials act. Investigations being made in conjunction with the geological survey and are to determine extent and quality of mineral deposits, the most suitable methods of mining and beneficiating them, the cost at which metals may be produced from them.

John W. Finch, director, bureau of mines, explained the co-operation between the bureau of mines and the geological survey in exploratory operations and the distinct and separate functions of the procurement division of the treasury department in administering that part of the act that provides for the purchase of strategic materials.

Mr. Finch emphasized the bureau of mines has nothing to do with acquisition of stockpiles. He also enumerated several services which are not authorized by the act but which the bureau, as the result of apparently widespread misunderstanding, has been repeatedly requested to perform.

### FURTHER STEEL HEARING DATE UNDETERMINED

When further steel hearings will be held before TNEC is dependent largely on when the United States Steel Corp. can produce witnesses in connection with the survey which the corporation is to present. General opinion is that this will be around the middle of January, but no date has yet been set.

Report of A. H. Feller, department of justice, which he will file with TNEC has been slowed up somewhat and it is not definite when it will be available. Report will be the result of the questionnaire sent by the department of justice to 50 of the larger steel units.

### EDISON ANNOUNCES NEW NAVY RESEARCH PROGRAM

Charles Edison, acting navy secretary, has announced a new order providing for the co-ordination of navy research.

New order directs that navy ordnance, aeronautics, and the bureaus of engineering, construction, and repairs each designate an officer in their respective bureaus "who shall be the head of a section devoted to science and technology."

Officers designated are to act as liaison with the naval research laboratory and are to be members of the navy department council for research. Director of the naval research laboratory is to be senior member of this new council. The purpose of the council will be to recommend to the secretary of the navy "action in respect to research problems, their assignment and measures to be taken to finance them."

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■ Factory sales of mechanical stokers in October totaled 18,222 units; in September, 20,398. Sales in October, 1938, were 17,681. Reports to the bureau of the census show ten months' sales this year were 89,883; last year 83,545.

# AVIATION

### HEAVY ORDERS INCREASE AIRCRAFT EXPANSIONS

■ ALTHOUGH aircraft industries have been fairly conservative in their plant expansions, burden of backlogs and mounting orders have forced several of them to extend their facilities, and to add more men to their respective payrolls. Lifting of the embargo, which caused an influx of foreign orders, together with sporadic placing of orders by both the government and commercial lines, have had decided effects.

United Aircraft Corp., East Hartford, Conn., since lifting of the embargo, has received heavy cash advances on the more than $70,000,000 worth of foreign orders. So heavy is this company's business that it is contemplating taking on 4000 more employes in the near future. United plans on moving in its new $1,000,000 factory addition to be completed early in January. New machinery for the plant will aggregate $3,000,000. Company's current backlog of $125,000,000 will necessitate using the new facilities as quickly as possible, with capacity operations being scheduled throughout 1940.

With the completion of a $5,000,000 order for 230 combat training planes for France, and an order of $12,000,000 for the same type of airplane for Great Britain, North American Aviation Co., Inglewood, Calif., received an additional order for 600 more of the same type of ships valued at $19,000,000. This company has hired 1000 new men in the last 60 days. Work is being pushed in North American's plant addition. With a backlog of $47,000,000, factory employs 5000 men and has enough orders to keep it busy for two years.

More machinery has been ordered by Fairchild Aviation Corp., Jamaica, L. I., as it increased its capacity 25 per cent.

#### Receives Additional Order

Official sources in the latter part of last week revealed Lockheed Aircraft Corp., Burbank, Calif., signed a contract with the British government for 200 additional reconnaissance bombers to cost over $20,000,000. Price includes complete planes and spare parts.

The same sources also disclosed that Lockheed has completed the $27,000,000 order for 250 reconnaissance bombers for Great Britain and will start on a $10,000,000 contract for 100 similar twin-engined warplanes for Australia. It was also stated properties of Continental Aeronautic Corp., which includes a going plant with 158,000 square feet and 23½ acres of land at Burbank, Calif., was purchased by Lockheed. Details of transaction were not revealed, but it is indicated the purchase price is about $600,000. Lockheed will move in all factory operations of its subsidiary unit, Vega Airplane Co.

Approximately 57 per cent of business on hand at Glen L. Martin Co., Baltimore, is for export, largely to France. The remaining 43 per cent is for the United States army and navy. The company now carries 13,000 men on its payroll. These are now working in three shifts.

Martin last week began cutting material for the first of the B-26 bombers which it is building for the United States army. The company has a contract for $16,000,000 covering the fighting planes which are to be delivered some time in 1940. An engineering staff of 500 has been working night and day in completing the details. Much of the materials for the new ship, however, has been delivered, and a considerable portion of the tooling up of the factory production has been completed. The new bomber is a bi-motored, all metal monoplane incorporating a number of new improvements.

From a foreign purchaser, Vultee Aircraft division, Aviation Mfg. Corp., Downey, Calif., received an additional order for 51 B-12 single engine bombers to be equipped with 1500-horsepower Wright engines. This brings the Vultee division's backlog to $8,000,000.

#### Tests Pursuit Plane

Vultee also is completing tests on a new pursuit plane which incorporates a Pratt & Whitney 1100-horsepower air-cooled radial engine. Plane is designed with a long nose which reduces air resistance. It is expected the ship will have a speed over 400 miles per hour.

Last week arrangements were completed for leasing of additional factory space which will increase, by one-third the floor area of Boeing Aircraft Co., Seattle. Company will occupy modern plant of Fisher Body Corp. adjacent to Boeing plant No. 2. Increasing the area from 574,000 to 764,000 square feet, according to P. G. Johnson, president, will permit sub-assembly work on current projects for both military and commercial.

Approximately 11,000 square feet of floor space will be added to the Propeller division, Curtis-Wright Corp., Clifton, N. J. A contract was awarded last week for the erection of a one-story building. This is the second expansion this year at Clifton, increasing the total area about 110,000 square feet, compared with 65,000 square feet at the beginning of the year. The company recently acquired Pittsburgh Screw & Bolt's hollow-steel propeller blade division.

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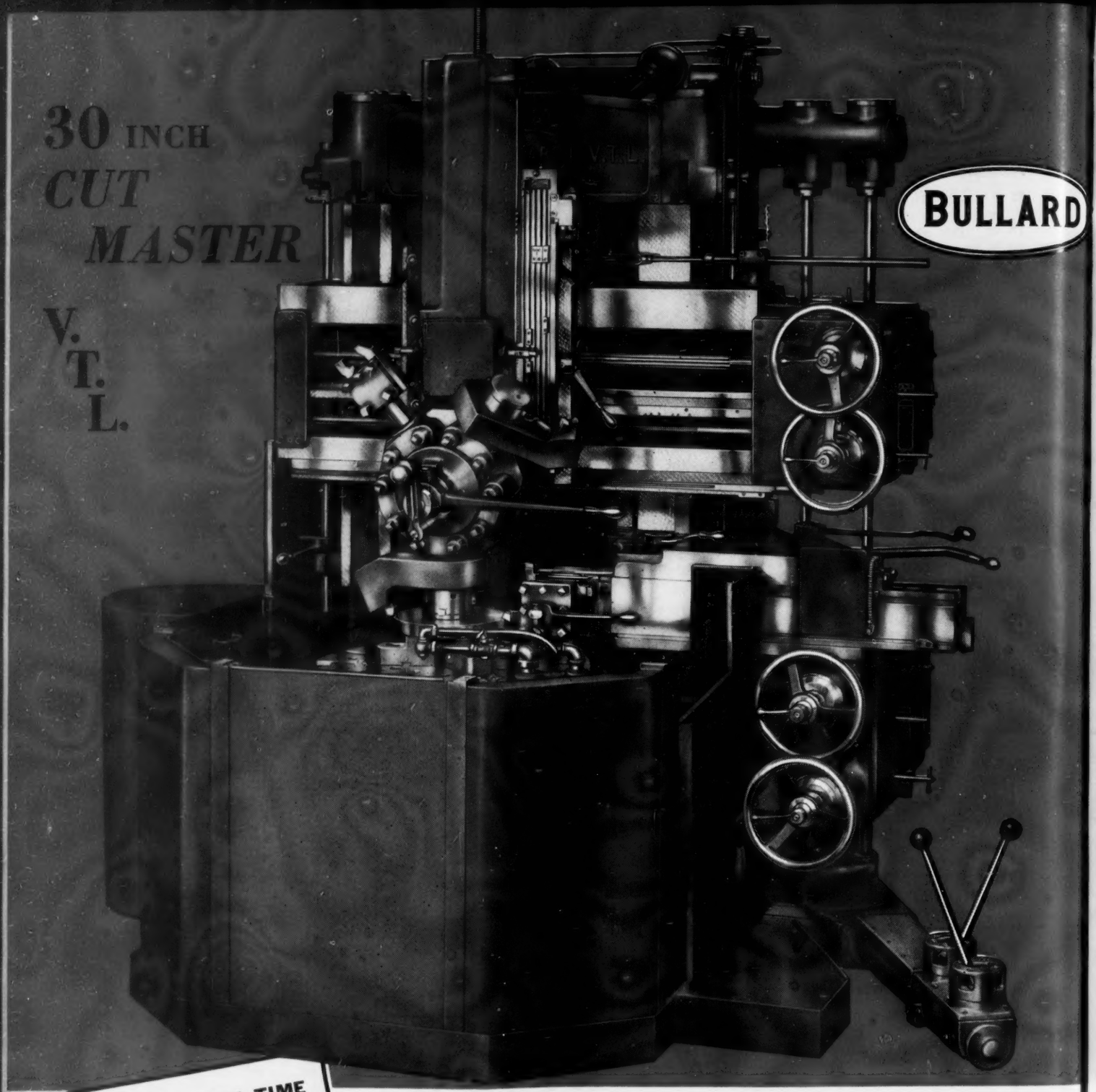
■ Steel barrel and drum production in October totaled 1,549,056 units, against 1,163,465 in September and 841,653 in October, 1938, as reported to the bureau of the census. Total for ten months, 8,717,996 units, compares with 6,938,155 in the corresponding period, 1938.

## Bombers and Spare Parts for Britain

■ **One of the largest aircraft commitments made in this country was completed recently by Lockheed Aircraft Co., Burbank, Calif. Order, signed by British air ministry, called for 250 reconnaissance bombers and spare parts for Royal Air Force, expenditure amounting to $27,000,000. Above is a general view of Lockheed plant showing several partially completed bombers. NEA photo**




**CUT MASTER CUTS TIME**

16 feeds—.0026" to .500".
20 table speeds.
Sufficient power for carbide tools.
Power Traverse for both heads.

**CUT MASTER ASSURES ACCURACY**

Massive one-piece column and bed.
Heavy Timken Roller Bearing Spindle.
Main Head vertical and horizontal screw feed.
Positive Pressure Lubrication.
Inbuilt accuracy produces accuracy.

## BALANCED ENGINEERING DESIGN

*Gets Those Jobs Out Faster*

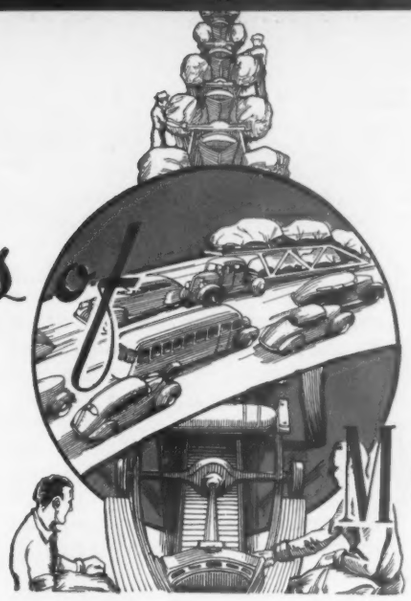
Modern carbide tools impose new designing problems. One way Cut Master meets them is with pressure lubricated Timken Roller bearing spindle which permits the heaviest cuts easily and with assured accuracy. This and many other anti-friction bearings throughout the machine assure efficiency of input horsepower as well as smooth delivery of this power at the point of cutting. This smooth flow of power is delivered over the full range of twenty different table speeds.

Our new circular discusses the many other new features which place Cut Master to the front in the Vertical Turret Lathe field.

BRIDGEPORT **THE BULLARD COMPANY** CONNECTICUT

# CUT MASTER

# Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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*DETROIT*

■ SPEAKING before the Houston, Tex., chamber of commerce last week, William S. Knudsen, president of General Motors Corp., glanced back over the past decade in the motor industry and reviewed some of the tribulations incident to the building of automobiles. To Texans his remarks provided much food for thought; to those allied with the motor industry they were more in the nature of a summary of "sad but true" events of the period 1932-39.

"In our industry," Mr. Knudsen declared, "we use a great deal of steel and most of this steel has to be heat treated to obtain the proper strength and durability. Let industry look upon this period of life in the United States as its heat treating period from which we will come out stronger and more durable." It is perhaps presumptuous to add the hope this national heat treatment will be of such a character that no intergranular corrosion will develop in the years to come.

Looking back to the early days of the 1934 union organizing campaigns in the motor industry, Mr. Knudsen commented on the origin of the term "speed-up", of which so much has been heard since. He pointed out that "organizers for the early locals were all trade unionists and when they saw a conveyor line they were perfectly aghast at all the movement, so that they could only arrive at the conclusion the effort was tremendous and the conveyor a perfectly inhuman thing.

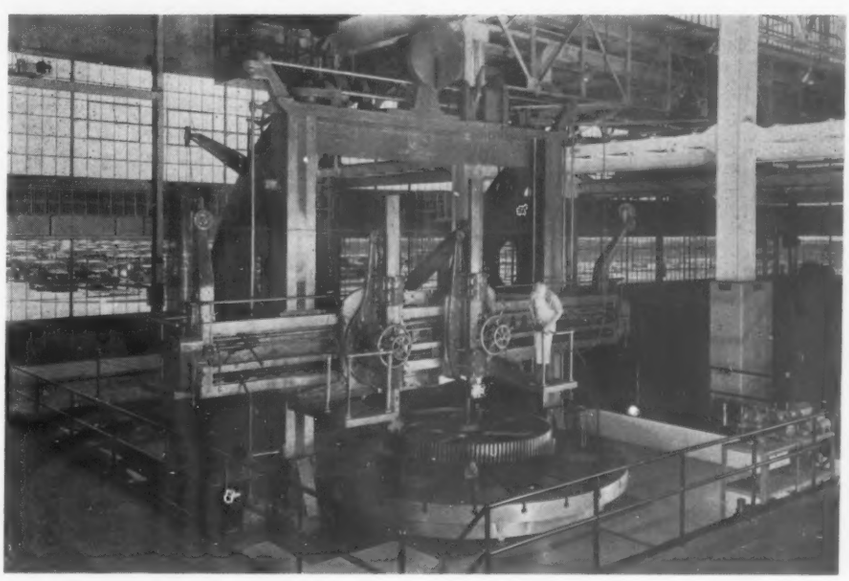
"Now, to get at the root of the thing, a motor car weighs on an average 3200 to 3400 pounds. This material has to be handled until the car is started and can handle itself. The first motor cars were built in stalls, one at a time, and all the different units had to be carted to the stall and handled by the men in assembling. An early mechanic in the motor car industry (often identified as C. E. Sorenson of Ford—Ed.) evidently visited a packing house and saw how pigs were strung up and dismembered without being handled, and conceived the idea that if most or all of the material handling could be taken care of by conveying, work would be lighter and more efficient. So we got the conveyor which produces nothing but acts as a material carrier, leaving the mechanic free to do the work.

"Various claims have been made that by moving the control up a notch on the conveyor, production can be increased. This, of course, is silly, as all supporting operations are geared to the conveyor speed and the whole picture must stay in balance in order to provide a steady flow of finished product.

"However, the term 'speed-up' was a good word and it made an impression on people who were unfamiliar with the plant operations. There is no sense in setting production rates which are difficult or unreasonable—the only result of such practice is bad work, which is a hundred-fold more expensive than any saving that could be gained in productive labor costs."

On the subject of seniority, pro-

## Vertical Lathe in Ford's New Tool and Die Shop



■ **To handle large dies for automotive stampings, exceptionally heavy equipment is required in the new tool and die shop of Ford Motor Co., such as this huge vertical lathe. Compare its size with that of the man standing on the platform**

visions for which are carefully detailed in union contracts with motor companies, Mr. Knudsen also had some noteworthy observations. "On the face of it," he said, "it seems reasonable that men with the longest service shall retain their employment the longest when adverse business conditions require reduction in the working force. However, there are drawbacks. If an entire city is organized, the man is practically becoming a serf to the company which gave him his first job. If he is laid off, he cannot go elsewhere unless he starts at the bottom of the seniority list and if he does he has to leave when he is called back to his original job, or else forfeit his seniority standing.

"The net result is that seniority protects the poorer worker and hamstrings the good mechanic who hesitates to throw his standing away in order to get a job more to his liking. It also seriously interferes with young people getting jobs in industry where a union contract eliminates them from any consideration until new employment is created.

**Sees Seniority System as Menace**

"As long as I have known anything about industry the older men in point of service and skill always have been the last to be laid off, but with the varieties of seniority rulings now in force—departmental, occupational or plant-wide — the whole system is getting to be more of a menace than a benefit.

"Security to my mind is a much overworked expression nowadays. It has almost come to stand for a living whether anyone works or not. Recent legislation, projected or rejected, brings to the forefront more and more the idea that this world owes everybody a living regardless.

"I believe that whatever our difficulties have been during the past ten years—whatever they will be during the next ten years—industry in the United States will work to improve its products through experimentation and research. It will adopt such social measures as are consistent with good business practice and retain its place in the world markets because we have in our country the material, the men and the incentive to make things better."

■ FROM a production standpoint, the industry currently is operating on a near all-time record basis. Weekly output of around 120,000 cars is made up, roughly, of 24,000 from Ford, 26,000 from Chrysler, 49,000 from General Motors, 3000 from Hudson, 3000 from Packard, 2000 from Nash, 3500 from Studebaker, 1000 from Willys and the balance from independent truck builders and other miscellaneous assemblies. December will see around 450,000 cars and trucks produced.

Continued mild weather in the middle west has been an important factor in the strength of new car sales. In Detroit, for example, there had been no snow up to Dec. 13 and no uncomfortably cold weather. In face of this break from the weather man, buyers of new cars were not postponing purchases, and the added impetus of the Christmas season has made the lot of most retail outlets a joyful one, darkened only by inability to obtain delivery of some models.

Pontiac reports the greatest November car sales in its history, the total being 21,539, or 44.7 per cent ahead of last year. Up to Dec. 1, 59,218 cars of 1940 series had been completed, or 64 per cent ahead of the same total for last year. Projecting this record ahead, sales officials predict a 48-55 per cent increase for the model year, or assembly of around 220,000 cars.

Hudson sales for the week ended Dec. 2 totaled 2500 and represented the best sales week since June 19, 1937. By the end of this month, Hudson will have shipped to dealers in the United States alone more cars than were shipped in the entire 1939 model season.

Chevrolet sales figures for November show the highest total for any one month since August, 1937 —89,377 cars and trucks, a gain of 16.2 per cent over November, 1938.

Willys sales to dealers in November were 71.8 per cent ahead of the same month last year.

## Automobile Production

Passenger Cars and Trucks—United States and Canada
By Department of Commerce

| | 1937 | 1938 | 1939 |
|---|---|---|---|
| Jan. | 399,186 | 226,952 | 356,950 |
| Feb. | 383,900 | 202,597 | 317,517 |
| March | 519,022 | 238,447 | 389,489 |
| April | 553,231 | 237,929 | 354,263 |
| May | 540,377 | 210,174 | 313,214 |
| June | 521,153 | 189,402 | 324,235 |
| July | 456,909 | 150,450 | 218,478 |
| Aug. | 405,072 | 96,946 | 103,343 |
| Sept. | 175,630 | 89,623 | 192,672 |
| Oct. | 337,979 | 215,286 | 323,017 |
| 10 mos. | 4,292,459 | 1,857,806 | 2,893,178 |
| Nov. | 376,629 | 390,405 | ..... |
| Dec. | 347,349 | 406,960 | ..... |
| Year | 5,016,437 | 2,655,171 | ..... |

Estimated by *Ward's Reports*

| Week ended: | 1939 | 1938† |
|---|---|---|
| Nov. 18 | 86,700 | 96,735 |
| Nov. 25 | 72,520 | 84,730 |
| Dec. 2 | 93,638 | 97,795 |
| Dec. 9 | *115,488 | 100,705 |
| Dec. 16 | 117,805 | 102,905 |

†Comparable week.

| | Week Ended Dec. 16 | Dec. 9 |
|---|---|---|
| General Motors | 49,355 | 48,925 |
| Chrysler | 27,400 | *25,980 |
| Ford | 25,275 | 24,225 |
| All others | 15,775 | 16,358 |

*Revised

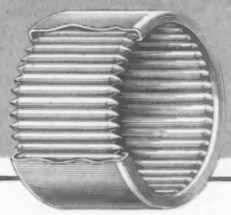
■ INTERESTING experiment is being made here by Holley Carburetor Co. as to the effect of music on morale and efficiency of plant employes. A large radio-phonograph has been installed in the shop and during lunch hour and promptly at quitting time in the afternoon it is set in operation. Employes are permitted to dance during noon hour and are said to be much in favor of the musical interludes. Officials are understood to be considering the probable effect of playing of music during actual working hours. Soothing effects of Benny Goodman and Guy Lombardo on the nerves of men and women busy on small machining and assembly operations might be such as to improve efficiency and speed output. Holley produces carburetors for several customers, the largest being Ford which divides carburetor requirements between Holley and the Ford carburetor plant at Milford, Mich. Other products include a wide range of automotive specialties such as distributor heads and the like.

**Ford Loses Tax Appeal**

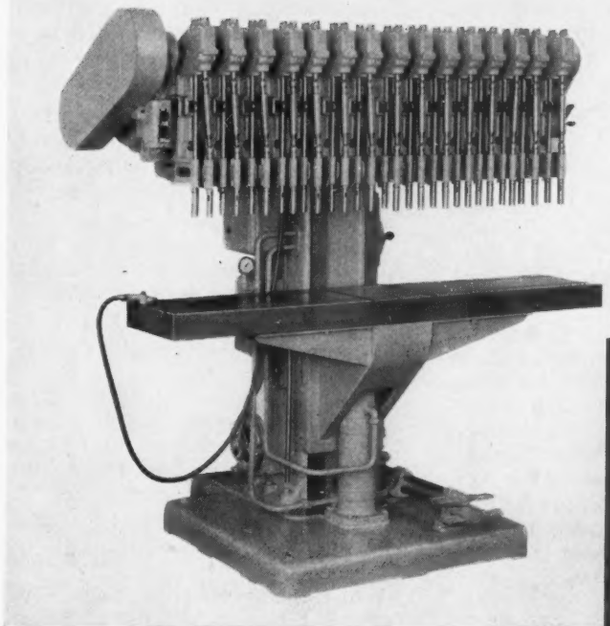
While music may stir the fingers of plant forces to unprecedented agility, the daily blare of a gang of loudspeakers in the vicinity of General Motors, Fisher and New Center buildings, beehives of office activities for motor companies and a host of supply sources, was proving disconcerting to many last week. Thousands in this nerve center of the industry are strong believers in the spiritual elevation produced by a Christmas carol, but they found themselves wincing as six amplifiers bellowed forth the glad tidings.

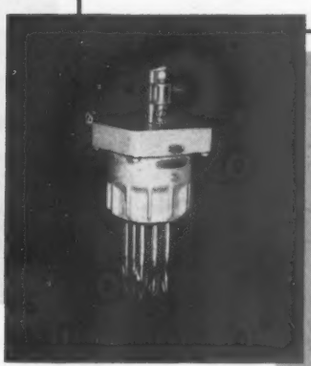
Legal department of Ford Motor Co. is studying an adverse decision handed down by the Supreme Court in Washington, after Ford had questioned the constitutionality of the Texas franchise tax law which requires in addition to a long-term permit fee an annual franchise tax for the privilege of doing business within the state. The tax is based on the capital employed in the business, 60 cents per thousand for the first million and 30 cents for each additional thousand. Texas seeks to levy the tax on the basis of a graduated charge upon such a proportion of capital stock and undivided profits of a corporation as the gross receipts of Texas business relate to total gross business inside and outside the state.

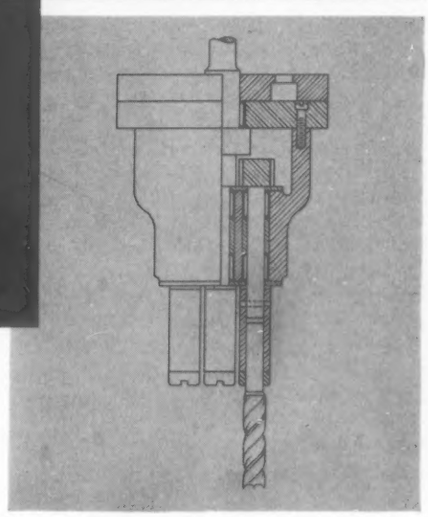
# No Bearing Replacement IN 4 YEARS



**TORRINGTON NEEDLE BEARINGS TAKE SPINDLE SHOCK LOADS THAT ONCE RUINED BUSHINGS**







(*Above*) **Intricate Multiple Spindle Drill in which 105 Torrington Needle Bearings give trouble-free performance under very close space limitations.**

(*Above*) **B. M. Root Company's 9-Spindle Fixed Center Drill in which 19 Torrington Needle Bearings are used.**

(*Right*) **Cross-section shows how Needle Bearings overcome space limitations and keep spindles in alignment.**

HUNDREDS of multiple-spindle Fixed Center Drills equipped with Torrington Needle Bearings have been in service since 1935 with never a call for bearing replacements. B. M. Root Company of York, Pa., manufacturer of the equipment, states that *Torrington Needle Bearings have virtually eliminated servicing.*

One hundred and five bearings are used in the large unit shown above, and the B. M. Root Company says, "One of the greatest advantages is the fact that in many close-center applications it is the *only* anti-friction bearing that could possibly be used."

The full complement of rollers in these bearings provides many linear inches of contact with resulting high capacities. Small, light, simple in design, simple to install, they frequently allow economies in machine assembly in addition to increasing efficiency.

After Needle Bearings were installed in the 9-Spindle drill shown, higher speeds were obtained without additional provision for lubrication. Because of the lip construction of their retaining shells, these bearings not only retain lubricant for long periods but also keep out dirt and metal chips ruinous to bushings.

The Torrington Engineering Department will be glad to work with *you* in adapting the advantages of the Needle Bearing to *your* products. For further information write for Catalog No. 10. For Needle Bearings to be used in heavier service, request Booklet 103X from our associate, the Bantam Bearings Corporation, South Bend, Ind.

*The Torrington Company*
ESTABLISHED 1866
*Torrington, Conn., U.S.A.*
*Makers of Ball and Needle Bearings*
New York Boston Philadelphia Detroit
Cleveland London, England

**TORRINGTON NEEDLE BEARING**

# Current Events In Chicago . . .

By J. F. POWELL
Chicago Editor, STEEL

■ IN CHICAGO after a seven months' stay in the Netherlands where he was engaged in the preparation of plans for a new plate mill, E. Gordon Fox, vice president, Freyn Engineering Co., Chicago, brought back an interesting description of that country's steel industry. There the Royal Dutch Blast Furnace & Steel Works is building a mill for plates up to 110 inch, because of the demand for ship plates, and because pig iron exports had become more difficult.

The mill is expected to operate early in 1941. It will augment existing facilities of the Royal Dutch works, which include three 500-ton blast furnaces and two 75-ton stationary open hearths at Ymuiden, west terminus of the North Sea canal. This plant, owned by a corporation with government participation, is now building two more 75-ton open hearths. It is the sole iron producer in Holland. The open-hearth furnaces follow American practice but the layout is more Continental; charging boxes are outside the building columns, involving a rotary movement of the charging car with each box.

Ingots are transported to the adjoining plant of Van Leer's Associated Factories, which boasts a small sheet mill, and a billet and sheet bar mill. A merchant mill for the smaller sizes also is being built.

### War Increases Plate Needs

Holland produces its own metallurgical coke, although requiring a mixture of about 50 per cent German or British coal. Holland's own coal comes from the Limburg region between Germany and Belgium. This region has an elevation of 1000 feet above sea level, contrary to a conception Holland is all canals and floodlands. The country, however, has no iron ore, but uses principally French, Spanish and Swedish ores.

Being about the fifth largest shipbuilding nation, plate demands are usually high. Equipment contracts for the new mill carried a cancellation clause, should war break out in Europe before Oct. 1. War, of course, came Sept. 1, while Mr. Fox was still in Holland, but the Dutch are going ahead with the mill anyway. The war has increased building costs, but also increased plate needs, with the numerous ships vital for Dutch colonial trade being sunk. Previously, plates had been imported chiefly from Germany, Belgium and United States, with the latter getting a large share of the business because of the superior quality of its plates, Mr. Fox adds.

♦

### Will Open Hall of Metals

Museum of Science and Industry, Jackson Park, Chicago, plans to open its Hall of Metals to the public early in 1940, it was learned last week. Foyer of the hall will have a metals motif. Floor will be a mosaic of steel shapes, with sections of bars, rails, squares, octagons, and other forms imbedded in it. Inland Steel Co., Chicago, has commissioned Edward Trumbull, New York artist, to do the murals in the foyer, and a preliminary sketch indicates they will be a symphony of ladles, gears, and other symbols of the industry, done in colors.

First to catch the eye in the main hall is a steam hammer built by James Naismith some 100 years ago. Other exhibits will include blast furnace and open-hearth models and a working model of a continuous strip mill. Machine tool industry will be well represented, as will practically all branches of the metal working field.

♦

### Railroad Recalls Men

Chicago & North Western railroad has recalled 278 men to work in its car and locomotive shops, R. L. Williams, chief executive, revealed last week. Considerable work is being done on passenger cars for winter runs to California, while 220 of the 278 men will be employed repairing locomotives. Over $100,000 is being spent for reconstruction and improvement of the locomotive shops here. Encouraged over business prospects, Mr. Williams stated he thought present situation would continue for at least several months.

♦

### Harvester's Hospitalization Plan

Employes Benefit association of International Harvester Co. announced adoption of a hospitalization plan under which employe-members will receive benefits of $4.50 a day, up to a maximum of 31 days, when confined in a hospital, effective Jan. 1. An employe-member will contribute 12 cents a week, or 52 cents a month, depending on whether he is paid weekly or monthly, to a hospitalization fund. Company will contribute to this fund an amount equal to 20 per cent of the employe contributions.

# Activities of Steel Users, Makers

■ METAL Specialty Co., Cincinnati, has purchased a new building and property in Richmond, Ind. An addition has just been completed, twice the size of the original building this to be used for stamping, forming, assembling and rolling of metals, which operations were formerly carried on in Kokomo. The smaller original building will be used for the manufacture of plastic injection moldings.

♦

Davis Keyseater Co., Rochester, N. Y., is erecting a steel and brick addition to its plant, with about 1500 square feet of floor space.

♦

Vulcan Steam Forging Co., Buffalo, has been appointed warehouse distributor in the Buffalo territory for Bethlehem Steel Co., Bethlehem, Pa., handling Bethlehem tool steels.

♦

Vanadium Corp. of America, New York, has removed its Pittsburgh district sales office from its Bridgeville, Pa., plant to the Henry W. Oliver building, Pittsburgh. G. F. Frietschi is Pittsburgh district manager of sales.

♦

William Jessop & Sons Inc., New York, has established a warehouse and sales office at 1024 West Seven Mile road, Detroit. E. R. S. Reeder has been appointed Detroit district sales manager. A complete range of sizes and analyses of tool and die steels will be carried.

♦

Progressive Welder Co., Detroit, maker of hydraulic welding and punching equipment for special and general industrial uses, has awarded contracts to the Austin Co., Cleveland, for the design and construction of a modern plant. The new plant, occupying a three-acre site at 3080 Outer drive at Moenhart avenue, will be ready for occupancy Feb. 15. The initial unit will provide over 27,000 square feet of floor space.

♦

Monarch Steel Co., Indianapolis, is building a new cold drawn mill, to be completed late this month. Cold drawn bars, wire products, turned and polished shaftings, and precision turned, ground and polished materials will be manufactured in the new addition. First unit of the plant under construction consists of a storage building, pickling unit, power house, and a large building for finishing steel. Several more structures for finishing capacity will be built.

# Salesmen See Good Prospects

■ GENERAL business will be satisfactory throughout the United States for first quarter at least, forecast salesmen for Warner & Swasey Co., Cleveland turret lathe manufacturers, in Cleveland for the company's annual sales conference. Salesmen were questioned on the business picture in their respective territories.

To the question, "What is the outlook for business in general in your territory for first quarter?" 16 of the 21 salesmen answered "good" and five answered "fair." Not one thought business would be "poor."

**"Not Building Inventories"**

Replies to a question as to current business picture with respect to producers' goods industries, consumers' goods industries and metal trade, placed producers' goods industries in the lead. Seventeen rated producers' goods as "good" and four as "fair." Eleven rated consumers' goods industries as "good" and ten as "fair." Retail trade ratings were ten "good" and 11 "fair."

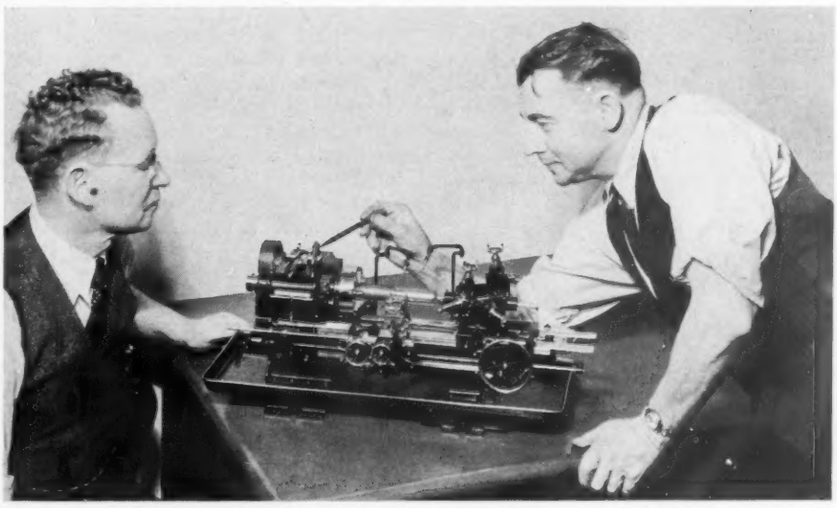
All the salesmen agreed business now being done by manufacturing concerns reflects actual demand and not a build-up of inventory in hands of manufacturers, dealers and retailers based on hopes and expectations. One commented: "Do not know of any case where business on hand does not reflect actual demand." Another said: "All purchases against backlog of orders." Only exception was in brass and copper products, chiefly for plumbing purposes, where a winter inventory build-up is natural.

While it was noted some manufacturers had covered future materials and supplies requirements, based on anticipated business to some extent, general opinion was that barring an unexpected or sudden falling off in business, manufacturers would not find themselves with unwanted inventories.

Industries listed in reponse to the question, "What industries in particular in your territory are enjoying exceptionally good business?" were: aircraft and aircraft accessories, steel, machine tools, automobiles and automobile parts, plumbing goods, electrical and power transmission equipment, instruments, cameras, farm machinery, motion picture equipment, cranes, excavators, pumps and compressors, stokers, diesel equipment and textile machinery. In Houston, Tex., retail trade and building, both residential and commercial, were reported as exceptionally good.

"By far the most important conclusion to be drawn from these replies," Charles J. Stilwell, Warner & Swasey president, said, "is that although business received a decided impetus from war abroad and defense at home, the major share of our present manufacturing activity is in fact founded upon actual current demand for and consumption of the goods and merchandise designed to fulfill the normal peacetime needs of the American people."

## Foreman Exhibits Miniature Lathe at Hobby Show



■ Model turret lathe that is an exact replica in every detail of a full size machine stole the show when employes exhibited their hobbies at the Warner & Swasey Co., Cleveland, open house last week. The work of Paul H. Klamm, a planer department foreman, the miniature lathe has turrets that actually index, a head stock with complete range of adjustable speeds, an oil pump that circulates coolant, and all other details found in a regular tool. And everything works. Not more than 20 inches in overall length, the model has gears in apron feeds as small as ¼-inch in diameter. In photo, Mr. Klamm, right, who spent 1200 hours build the miniature, is explaining its fine points to Nels Swenson, Warner & Swasey plant superintendent.

## Moderate Rise in 1940 Seen by Colonel Ayres

■ Business developments in 1940 will be shaped by war and the national political campaign, and since both are unpredictable, accurate forecasts are impossible, stated Col. Leonard P. Ayres, vice president, Cleveland Trust Co., before the Cleveland chamber of commerce last week. Colonel Ayres, however, ventured the following predictions:

Volume of industrial production, which was about 105 this year, will be about 110, and the average for the year will not vary from that level by 10 per cent.

National income, which will be about $69,000,000,000 for 1939, will probably total $71,000,000,000 in 1940.

Contracts for new building probably will be larger than those for any previous recovery year, and the largest since 1930, but not as large as those of that year.

Railroad freight loadings will be larger than those of 1939, but larger by less than 10 per cent.

Iron and steel output probably will vary not more than 12 per cent from 1939.

Automobile production seems likely to be within 10 per cent of 1939 output.

Total of wage payments reached in 1937 its highest level since the bottom of the depression, and in 1940 probably will be within 4 per cent of that sum.

## Employes With Long Service Record Honored

■ Seventy centuries of continuous service for the same company were recognized Dec. 9 by the American Steel & Wire Co., subsidiary of United States Steel Corp.

A total of 244 employes whose accumulated service adds up to 6990 years were guests at a luncheon at the company's American Works, Cleveland, and were awarded the corporation's service medals. Individuals participating included employes who have worked for the company for periods ranging from 25 to 50 years.

# National, Industrial Reforms, More Employment, Aim of Manufacturers

■ A NUMBER of important resolutions were adopted by the Congress of American Industry, held in New York, Dec. 6-8, under the auspices of the National Association of Manufacturers. (For a previous report on proceedings at this meeting, see STEEL, Dec. 11, pp. 15-18).

Holding that the reciprocal trade agreements program has involved abrogation of the principle of flexible tariffs providing for changes up or down as changing conditions may warrant, and that future reciprocal trade agreements should be made only on a bilateral basis, on findings of a nonpartisan, scientific, fact-finding committee and approved by the senate, it was resolved that negotiations of further trade agreements, including revision or expansion of old agreements, should be opposed, also that the reciprocal trade agreements act should not be extended in its present form beyond the June, 1940, expiration date.

As the underlying purpose of unemployment compensation laws is reduction of unemployment and not payment of benefits, the principle of experience rating for employers who regularize or stabilize employment should be embodied in all state laws. Social security laws should be revised to conform with sound financial and economic policy. Payment of all current benefits should be financed through current taxes so that revenue derived from these taxes will not exceed the expected amount of benefit disbursements; in this way curtailment of purchasing power on the part of industry and wage earners in excess of benefits will be obviated.

### Should Balance Budget

Pump priming is a repeatedly demonstrated failure. The budget should be balanced at the earliest possible date, without depriving the destitute of sustenance, primarily by reduction of expenditures, since added taxation without national financial balance would precipitate a condition worse than the present. Our complete tax structure should be studied thoroughly by an impartial committee representing federal and state governments, business and labor interests.

The two securities acts should be consolidated and provisions moderated to encourage and facilitate investment of new capital in employment-creating enterprise; this to be accomplished without affecting desirable objective of these acts.

The Walter-Logan bill, designed to prescribe limitations to the powers to be exercised by administrative boards and agencies of the federal government, should be enacted by the next congress in order to establish standards of administrative procedure.

If continued in effect, the fair labor standards act should be amended to remove unnecessary hardships to employers and to correct unsound interpretations and policies which have developed in its administration.

Inequalities under the national labor relations acts and its administration should be removed in order to contribute to continued and sustained improvement in business and employment.

The Borah-O'Mahoney federal licensing bill should not be enacted; it would bring a dangerous compulsory control over industry.

### War Is Out

The Guffey coal act should be repealed promptly. Government competition with private enterprise should cease. The country must be kept out of war. Solution of the transportation problem should be expedited and that shippers should be asked to contribute to this effort. To help the farmer, the association's agricultural committee should continue its research work.

Speaking on principles behind employer-employe harmony, Charles R. Hook, president, American Rolling Mill Co., Middleton, O., pointed out that workers generally have the same wishes, desires, hopes, ambitions and aspirations as management. They look forward to climbing the ladder of progress so they can provide a better standard of living for their families. The form of employer-employe relations never can be the same in two plants, but the basic principle always is that of mutual interest and understanding. Where management is frank and honest, and the men feel they are treated fairly, harmony usually prevails.

Mr. Hook objected to the phrase "collective bargaining" because it implies that one party to the negotiations will obtain advantages at the expense of the other. He very much preferred the term "collective co-operation."

Have we gone so far in regulating free economic enterprise that we have taken the life out of it? This question was asked by Wendell L. Willkie, president, Commonwealth & Southern Corp., who said that from now on our purpose should be not to augment the powers of state but to increase the opportunities offered to capital. He protested against the rapid increase in the number of state tariffs and regulations which interfere with interstate commerce. He protested against government agencies which possess both prosecuting and judicial powers. "There isn't a man in this room," he declared, "who does not know that if he criticizes a commission today, he and his company may suffer for it tomorrow."

### Mend Business Methods

Government is not the only transgressor; business too needs to mend its ways, said Mr. Willkie, continuing: "For many years various sections of American industry have asked for special legislation which offered a temporary benefit at the expense of normal economic processes. Business has asked for special subsidies and special tariffs, for special protection against price cutters or low-cost producers, for government appropriations for this or that special purpose. Business cannot ask for government interference at one time and then indignantly reject it at another. It has not been a pretty picture to see business, in the hope of advantage, craven and afraid to take its case to the people."

Factors that threaten to change our national character were discussed by H. W. Prentis Jr., president, Armstrong Cork Co., Lancaster, Pa., and the association's new president. Citing the wages and hours act, he asked: "What subtle influence does it have on a young man, paid a decent salary and expected to work only a reasonable number of hours when you, his employer, are forced by statute to compel him to watch the clock; when, no matter what his interest in his job may be, he makes you a lawbreaker if he comes back to work of his own volition, without your knowledge, after office hours? How would the present business leaders of America have developed under such a program?"

Members of congress are sincere and determined to aid business, declared Senator Burton K. Wheeler, Montana. He said he had no doubt but what corrective steps would be applied to the national labor relations act and its administration at the next session. No government, he stated, can spend more than its income over a considerable time without coming face to face with bankruptcy, with dictatorship as a consequence. Congress, he said, is aiming at a balanced budget.

Senator Wheeler criticized industry for "the mistake of over-emphasizing your sales and merchandising activities on the assumption that

shrinking patronage can be bolstered through redoubled sales effort." That, he believed, was putting the cart before the horse. It is not necessary to high-pressure John Jones into buying a new automobile. "You don't have to high-pressure him into buying new clothes or more food or even a new home, —he wants them all. His wife wants a new refrigerator for her kitchen. John Jones and his wife and 40 million others lack the means to buy goods with which our markets bulge. Industry has created the demand—but neither government nor business have provided the necessary purchasing power." Industry should devote its energies to finding ways to give the farmers and the workers the necessary purchasing power, he said, to keep plants running, not 50 per cent, but 100 per cent all the time.

Why does capital exploit labor? This is a widely asked question in this country, said A. W. Hawkes, president, Congoleum-Nairn Inc., New York, because a good many people seem to think that business makes an illegitimate profit out of its workers. He believed that if management had furnished leadership for labor, labor would never have gone outside for the kind of leadership that in many cases is injurious to it. One of the vital necessities is for management and labor to apply themselves immediately to creation of a favorable public opinion.

A junior achievement movement aimed at training young men to take care of themselves was described by S. Bayard Colgate, chairman, Colgate-Palmolive-Peet Inc., New York. In New York City are 52 junior achievement organizations through which 10,000 youths from 16 to 21 years of age have passed. Among these only half of 1 per cent are unemployed, as compared with the fact that 48 per cent of total unemployment is among youths in the same age group.

All true Americans support the work of the Dies committee which has revealed subversive forces for what they are, whittling the foundations of the American system away, said R. W. Moore, president, Canada Dry Ginger Ale Inc., New York.

Health and safety programs pay dividends not only in life and happiness but also in cash, said G. W. Cannon, vice president, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. He described the system by which this company has made its men health and safety minded, by which it has improved its industrial relations, and by which it has been able to effect a saving of 30 per cent in its insurance costs.

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■ Tin exported from Netherland East Indies in November totaled 3165 gross tons, it is reported by the International Tin Research and Development council, The Hague, to the American Iron and Steel institute.

## Mobile Laboratory Fights Fires

■ **Fire fighting with carbon dioxide or dry-ice gas will be demonstrated in large cities by this mobile unit, the Lux Laboratory of Fire Fighting. Sponsored by Walter Kidde & Co., New York, the unit's first road demonstration at Philadelpria, recently, showed how gasoline, oil and other liquid and electric fires are smothered by barrage of artificial snow, which cuts off fire's oxygen supply**

# MEETINGS

### COMMITTEES TO HAVE ONE DAY AT SCRAP CONVENTION

■ FIRST day of the twelfth annual convention of the Institute of Scrap Iron and Steel Inc., at the William Penn hotel, Pittsburgh, Jan. 9-11, has been designated "Committee Day." Special meetings are being arranged for the organization's committees on traffic, chapter welfare, yard dealers, and exports; others may be scheduled later.

Groundwork for a safety campaign in the scrap industry as the forerunner of an attack on industrial compensation rates will be laid by the yard dealers' committee. Standardized by-laws for all 19 chapters of the institute will be compiled by the chapter welfare committee. Current problems affecting freight rates and exports will be considered by the traffic and export committees, respectively.

A proposed uniform contract for the scrap trade and codification of trade customs and terms will be submitted by Benjamin Schwartz, formerly director-general of the institute and now a vice president, Schiavone-Bonomo Corp., Jersey City, N. J.

It is hoped the proposal will be studied by the 19 chapters so that final action may be taken at the midyear meeting.

### COAL CONVENTION AND SHOW TO BE HELD IN CINCINNATI

Seventeenth annual coal convention and exposition of the American Mining congress will be held in Cincinnati, April 29-May 3. Harry M. Moses, president, H. C. Frick Coke Co., Pittsburgh, is program committee chairman.

Tentative convention plans call for discussions on mechanization of mines, coal preparation, safety campaigns, and stream polution.

### EASTERN HIGHWAY OFFICIALS TO MEET IN ATLANTIC CITY

Association of Highway Officials of North Atlantic States will conduct its sixteenth annual convention at the Hotel Ambassador, Atlantic City, N. J., Feb. 14-16.

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■ Commercial steel castings bookings in October, as reported to the bureau of the census, totaled 119,687 net tons, compared with 96,687 tons in September and 25,418 tons in October, 1938. Production in October was 72,096 tons, in September 43,590 tons and in October, 1938, 28,109 tons. Orders booked in ten months this year aggregated 518,161 tons, compared with 264,508 tons in the corresponding months, 1938.

# Editorial

## *Why Not Try a New Approach?*

■ LAST WEEK President Roosevelt took umbrage at the declaration by Senator Robert A. Taft of Ohio that, with proper economies, the federal budget could be balanced in two years. The President said he would give anything in the world for a bill of particulars; he personally would give the senator a handsome prize if he would tell him how it could be done.

While STEEL is not familiar with all the minute details of Senator Taft's program, it believes that the problem of balancing the budget is relatively simple. Today, the federal government looks at the total amount of wealth in the national economy and tries to spread it around to do the most good. STEEL believes that the federal government instead should concern itself primarily with increasing the amount of wealth invested productively in the development of the national economy. Since our wealth can be increased only through production of more goods and services, that automatically would mean more jobs, more payrolls, greater public purchasing power, less need for relief. The extent to which production is accelerated would determine the extent to which the government could withdraw from its deficit spending and relief financing. If production is pushed with sufficient vigor, jobs will be more abundant and the problem of relief will diminish.

### Much Can Be Learned from Industry's Program for Encouraging Investment

President Roosevelt would do well to study and act on the declaration of principles and the resolutions adopted by the congress of American industry recently held under the auspices of the National Association of Manufacturers. From them he would discover that the manufacturers are more than anxious to help elevate the national economy to a plane that will bring more security and a higher scale of living for every American. How can this be brought about? The manufacturers concluded that this whole problem boils down to one imperative requirement—the investment of a great deal more capital in private industry.

### Present Attitude Toward Profits Main Barrier to National Progress

The President would also find that the present national attitude toward profits is held by the manufacturers to be the greatest barrier in the way of enlarged capital investment in industry. He would find that they have a carefully reasoned program which would make industrial investments more attractive. This involves mainly the revision of some of our existing laws and national policies and the character of their application.

Manufacturers desire a certain degree of revision of the fair labor standards, national labor relations, securities, social security and reciprocal trade agreement laws. They want a tax system least burdensome to industry. They want less government competition with private industry. They want an early, sound solution of the transportation problem. They want repeal of the Guffey coal act, and assurance that the Borah-O'Mahoney federal licensing bill will not be enacted into law.

None of the things that have been undertaken by our present national administration have worked insofar as our national economy is concerned. The farm, unemployment, relief and other problems continue unabated—and we continue to go further into the red. Why not try a new approach? Why not adopt the program of the manufacturers?

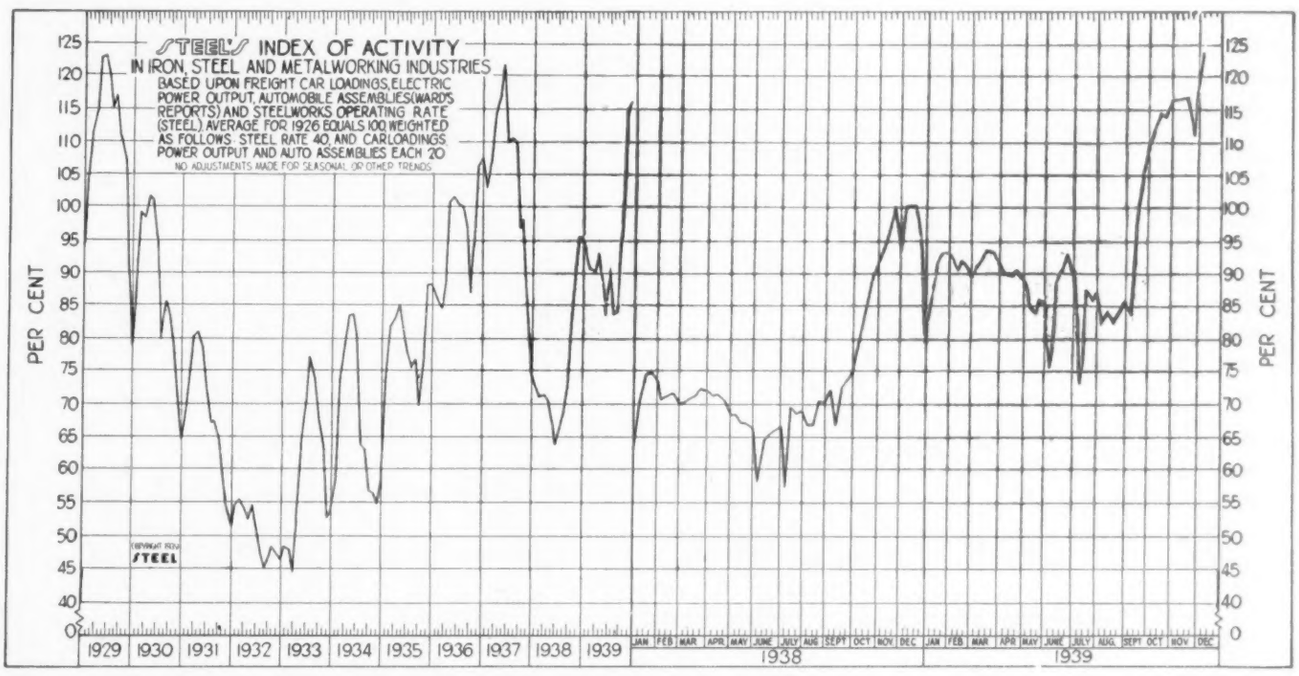
# The BUSINESS TREND

## Activity Index at Highest Level Since May 1, 1937

■ REFLECTING the sharp upturn in automobile production and electric power consumption during the week ended Dec. 9, STEEL's index of activity in the iron, steel and metalworking industries forged ahead to reach the highest level since the week ended May 1, 1937. The index now stands at 123.9, a gain of 6 points over the previous week's figure and compares favorably with the 100.7 level recorded during the corresponding week last year.

Steelmaking operations held unchanged from the peak level of year during the week ended Dec. 9. This important business indicator will probably recede slightly from the 94 per cent rate during the remaining weeks of this year. However, large order backlogs assure a good rate of operations in the steel industry through the early months of 1940. At this time last year the national steel rate was at the 61 per cent level, from which point it receded to 58, 52, and 40 per cent respectively through the remaining weeks of the year.

Automobile output in the week ended Dec. 9, of 115,488 units represented the largest weekly total since 122,890 cars were assembled during the week ended July 3, 1937. In the preceding week 93,638 units were produced and 100,705 in the corresponding week last year. With further week to week increases likely during December, automobile production in the fourth quarter is


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 0
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
1939

*STEEL'S index of activity advanced 6 points to 123.9 in the week ended Dec. 9:*

| Week ending | 1939 | 1938 |
|---|---|---|
| Sept. 23 | 103.0 | 74.0 |
| Sept. 30 | 107.9 | 74.9 |
| Oct. 7 | 112.5 | 78.9 |
| Oct. 14 | 113.9 | 84.3 |
| Oct. 21 | 113.6 | 88.7 |
| Oct. 28 | 116.2 | 91.4 |
| Nov. 4 | 117.1 | 93.4 |
| Nov. 11 | 117.2 | 95.9 |
| Nov. 18 | 117.3 | 100.4 |
| Nov. 25 | 111.4 | 93.9 |
| Dec. 2 | 117.9 | 100.1 |
| Dec. 9 | 123.9 | 100.7 |

| Mo. Data | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 | 1930 | 1929 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 91.1 | 73.3 | 102.9 | 85.9 | 74.2 | 58.8 | 48.6 | 54.6 | 69.1 | 87.6 | 104.1 |
| Feb. | 90.8 | 71.1 | 106.8 | 84.3 | 82.0 | 73.9 | 48.2 | 55.3 | 75.5 | 99.2 | 111.2 |
| March | 92.6 | 71.2 | 114.4 | 88.7 | 83.1 | 78.9 | 44.5 | 54.2 | 80.4 | 98.6 | 114.0 |
| April | 89.8 | 70.8 | 116.6 | 100.8 | 85.0 | 83.6 | 52.4 | 52.8 | 81.0 | 101.7 | 122.5 |
| May | 83.4 | 67.4 | 121.7 | 101.8 | 81.8 | 83.7 | 63.5 | 54.8 | 78.6 | 101.2 | 122.9 |
| June | 90.9 | 63.4 | 109.9 | 100.3 | 77.4 | 80.6 | 70.3 | 51.4 | 72.1 | 95.8 | 120.3 |
| July | 83.5 | 66.2 | 110.4 | 100.1 | 75.3 | 63.7 | 77.1 | 47.1 | 67.3 | 79.9 | 115.2 |
| Aug. | 83.9 | 68.7 | 110.0 | 97.1 | 76.7 | 63.0 | 74.1 | 45.0 | 67.4 | 85.4 | 116.9 |
| Sept. | 98.0 | 72.5 | 96.8 | 86.7 | 69.7 | 56.9 | 68.0 | 46.5 | 64.3 | 83.7 | 110.8 |
| Oct. | 114.0 | 83.6 | 98.1 | 94.8 | 77.0 | 56.4 | 63.1 | 48.4 | 59.2 | 78.8 | 107.1 |
| Nov. | 116.2 | 95.9 | 84.1 | 106.4 | 88.1 | 54.9 | 52.8 | 47.5 | 54.4 | 71.0 | 92.2 |
| Dec. | .. | 95.1 | 74.7 | 107.6 | 88.2 | 58.9 | 54.0 | 46.2 | 51.3 | 64.3 | 78.3 |

expected to be the second largest in history of the industry.

Electric power consumption soared to a new all-time high during the week ended Dec. 9, according to the weekly report issued by the Edison Electric institute. The rise in power output since the July 4 low has been the most rapid in the history of the industry. Recent gains in production have been due to heavier demand arising from the high rate of industrial operations coupled with expanding seasonal demand for lighting.

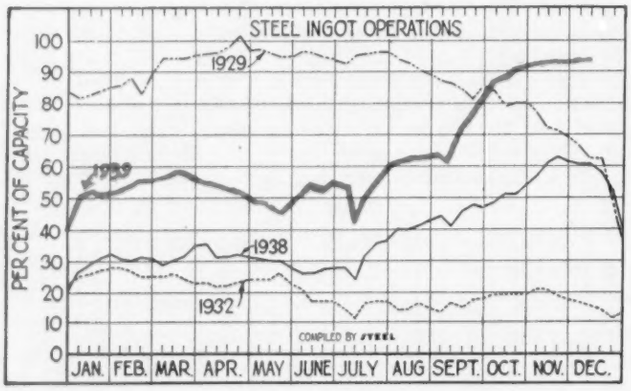
While industrial activity in most lines is currently running ahead of new business, the large order backlogs accumulated plus the steady inflow of additional orders is expected to maintain a high rate of operations through the early months of 1940. In a number of lines—iron and steel, machine tools, aircraft, shipbuilding, railway equipment—a good rate of production appears assured during the first quarter of next year on the basis of the order backlogs now reported.

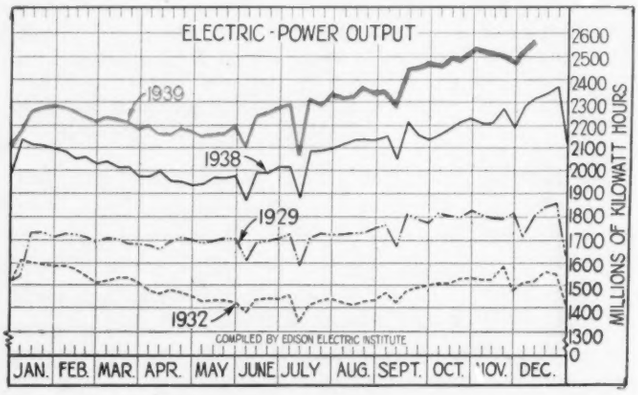
### NOVEMBER CONSTRUCTION RECORDS GAIN

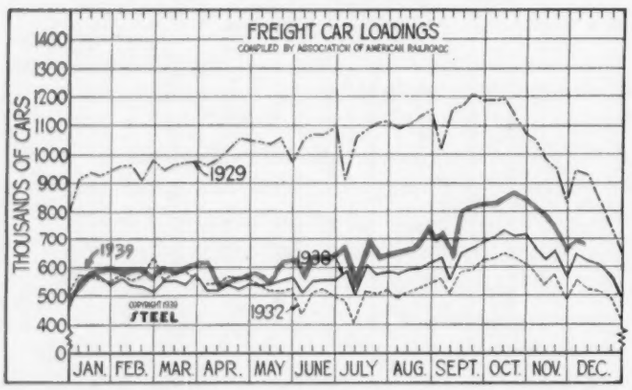
Increased activity in the non-residential, utilities, and public works construction during November, forced a moderate increase in the valuation of construction contract awards in the 37 eastern states, as compiled by F. W. Dodge Corp. The increase in awards last month regained part of the loss recorded during the previous period. Valuation of total construction during November totaled $299,847,000. This represents a moderate increase from the October figure of $261,796,000, but was slightly below the November, 1938, total of $301,679,000. In the first 11 months this year the total valuation of construction awards aggregated $3,196,445,000, or an increase of 13.8 per cent over the $2,807,489,000 total value of awards placed during the corresponding period last year.

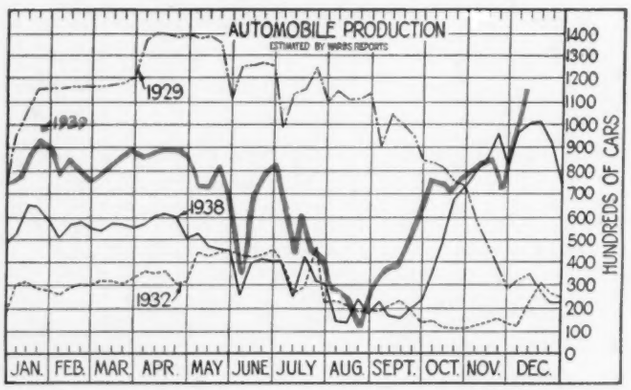
### FREIGHT CAR AWARDS DECLINE

Domestic freight car awards during November recorded a sharp decline from the level prevailing in the preceding two months. Awards last month totaled 2650 units, against 19,634 in October and 23,000 cars in September. The November figure brings the total for the first 11 months up to 57,740, compared with 13,722 in the corresponding period of last year, 51,336 in the same 1937 period and 41,073 in the first 11 months of 1936. Featuring awards last month was the placing of 1100 cars by the Delaware, Lackawanna & Western railroad.

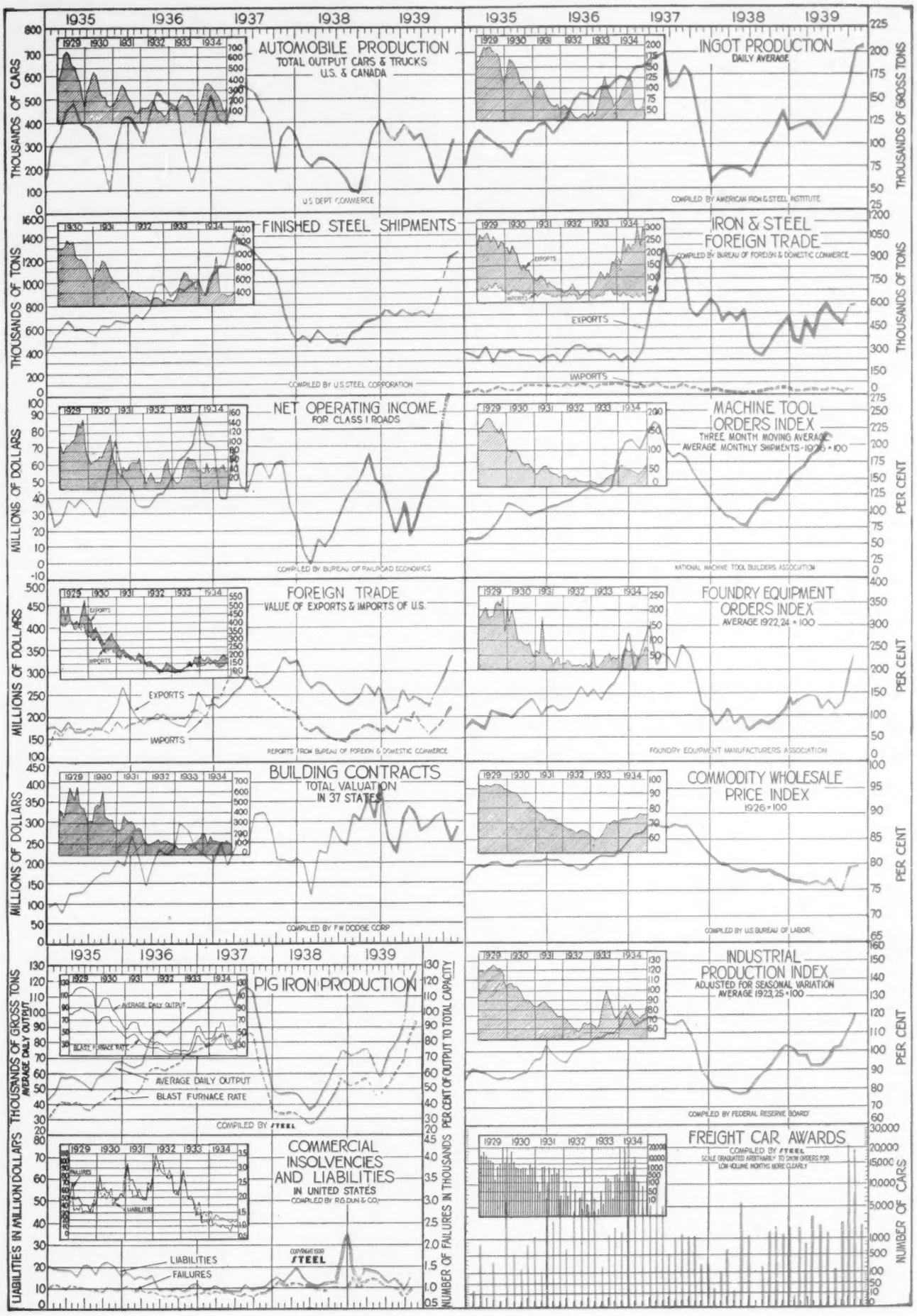


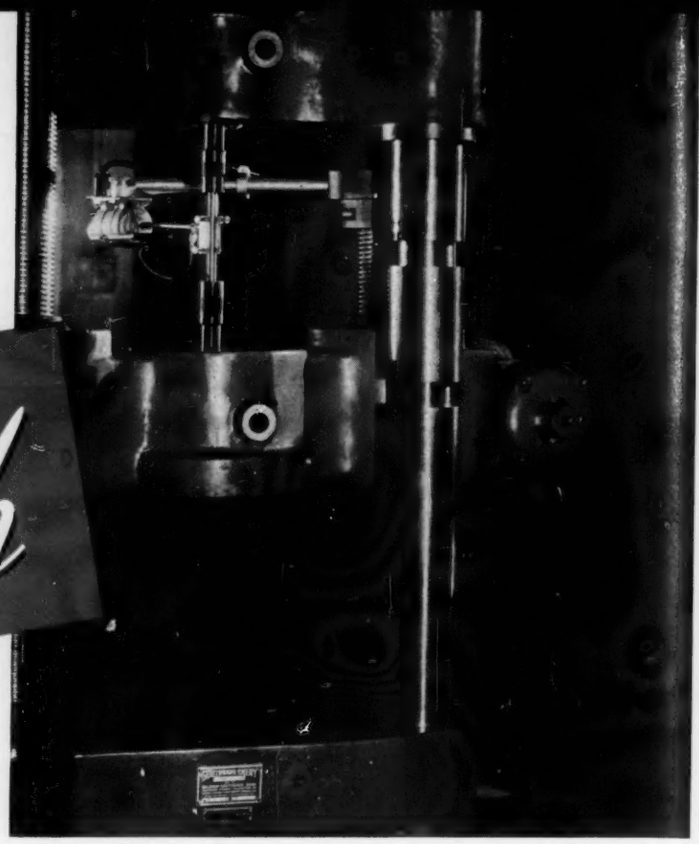




| Week ending | Steelworks Operating Rate Per Cent 1939 | 1938 | 1932 | 1929 | Electric Power Output Million KWH 1939 | 1938 | 1932 | Freight Car Loadings Thousands of Cars 1929 | 1939 | 1938 | 1932 | 1929 | Weekly Auto Output 1939 | 1938 | 1932 | 1929 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug. 19 | 63.5 | 41.5 | 15.5 | 90.0 | 2,368 | 2,139 | 1,431 | 1,750 | 674 | 598 | 518 | 1,136 | 12,955 | 23,940 | 19,568 | 111,902 |
| Aug. 26 | 63.5 | 43.5 | 14.5 | 89.0 | 2,355 | 2,134 | 1,436 | 1,762 | 689 | 621 | 538 | 1,160 | 18,365 | 18,700 | 19,896 | 113,316 |
| Sept. 2 | 64.0 | 44.5 | 13.5 | 87.5 | 2,357 | 2,149 | 1,464 | 1,675 | 722 | 648 | 561 | 1,017 | 25,240 | 22,165 | 19,561 | 90,913 |
| Sept. 9 | 62.0 | 41.5 | 15.5 | 86.0 | 2,290 | 2,048 | 1,423 | 1,806 | 667 | 569 | 501 | 1,153 | 26,865 | 17,485 | 21,586 | 104,351 |
| Sept. 16 | 74.0 | 46.0 | 15.0 | 84.5 | 2,444 | 2,215 | 1,476 | 1,792 | 806 | 660 | 587 | 1,166 | 41,245 | 16,100 | 23,116 | 100,042 |
| Sept. 23 | 79.5 | 48.0 | 17.0 | 82.0 | 2,449 | 2,154 | 1,490 | 1,778 | 815 | 676 | 596 | 1,202 | 53,950 | 20,390 | 19,327 | 95,453 |
| Sept. 30 | 84.0 | 47.0 | 18.0 | 85.0 | 2,470 | 2,139 | 1,499 | 1,819 | 835 | 698 | 622 | 1,179 | 62,755 | 25,405 | 13,265 | 83,201 |
| Oct. 7 | 87.5 | 48.5 | 19.0 | 84.0 | 2,465 | 2,154 | 1,506 | 1,806 | 835† | 703 | 625 | 1,179 | 76,095 | 37,665 | 14,568 | 82,088 |
| Oct. 14 | 89.5 | 51.5 | 19.5 | 79.0 | 2,495 | 2,183 | 1,507 | 1,799 | 845 | 727 | 650 | 1,186 | 75,860 | 50,540 | 12,675 | 81,882 |
| Oct. 21 | 91.0 | 51.5 | 19.5 | 80.0 | 2,494 | 2,214 | 1,528 | 1,824 | 861 | 706 | 642 | 1,134 | 70,114 | 59,860 | 11,165 | 76,870 |
| Oct. 28 | 92.0 | 54.5 | 19.5 | 80.0 | 2,539 | 2,226 | 1,533 | 1,816 | 834 | 709 | 617 | 1,072 | 78,210 | 65,335 | 11,117 | 73,048 |
| Nov. 4 | 93.0 | 57.5 | 21.0 | 77.5 | 2,537 | 2,207 | 1,525 | 1,798 | 805 | 673 | 587 | 1,050 | 82,690 | 80,030 | 12,257 | 61,824 |
| Nov. 11 | 93.0 | 61.5 | 21.0 | 73.0 | 2,514 | 2,209 | 1,521 | 1,794 | 786 | 637 | 537 | 983 | 86,200 | 86,094 | 13,685 | 49,160 |
| Nov. 18 | 93.5 | 63.0 | 19.0 | 71.0 | 2,514 | 2,270 | 1,582 | 1,818 | 771 | 657 | 576 | 950 | 86,700 | 96,735 | 16,497 | 38,219 |
| Nov. 25 | 93.5 | 62.0 | 17.5 | 69.0 | 2,482 | 2,184 | 1,475 | 1,718 | 677 | 562 | 494 | 837 | 72,520 | 84,930 | 13,389 | 28,079 |
| Dec. 2 | 94.0 | 61.0 | 16.0 | 67.0 | 2,539 | 2,286 | 1,510 | 1,806 | 689 | 649 | 547 | 937 | 93,638 | 97,795 | 12,398 | 31,255 |
| Dec. 9 | 94.0 | 61.0 | 15.0 | 63.5 | 2,586 | 2,319 | 1,519 | 1,841 | 687 | 619 | 521 | 923 | 115,488 | 100,705 | 21,695 | 33,293 |


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS-1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
THOUSANDS OF GROSS TONS
PER CENT
NUMBER OF CARS
LIABILITIES IN MILLION DOLLARS
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
PER CENT OF OUTPUT TO TOTAL CAPACITY
NUMBER OF FAILURES IN THOUSANDS

By J. J. KANTER
Research Metallurgist
Crane Co.
Chicago



Research

# LOOKS TO THE FUTURE

**To give long life to equipment for the chemical processing industries demands solution of many new problems due to ever increasing pressures and temperatures. Present work points way to many advances**

■ WITH THE new research laboratory of Crane Co., 836 South Michigan avenue, Chicago, in operation hardly more than a year, many developments already have been completed and many others are in progress.

The constant advance in temperatures and pressures has demanded detailed study of elevated-temperature characteristics of all materials entering into valves and fitting manufacture. Possibly the most important property of a metal at high temperature is its creep resistance. It is this factor which establishes allowable working stresses for metals at high temperatures and furnishes the basis for rating valves and fittings. Already much data is available on high-temperature characteristics of casting and forgings of numerous compositions. While much data is now available on creep characteristics and their correlation with short-time tests, an increasing amount of information is being accumulated in an attempt to establish reliable correlations.

Work done to date indicates that heat treatment is of prime importance as regards creep strength. For instance, by proper heat treatment it has been found that the creep strength of bolt material can be increased on a ratio of 4 to 1, giving a strength up to 40,000 pounds per square inch at 1000 degrees Fahr. where only 10,000 pounds per square inch is obtained through conventional treatment. Investigations to date appear to indicate that the conventional oil-quench-and-draw treatment is wrong if optimum creep properties are to be developed in the material.

Correct grain size also is important for maximum creep strength. A coarse grain size in general appears most suitable for development of optimum creep strength, while the fine grain size sought for strength, hardness and toughness at ordinary temperature is associated with poor creep resistance.

A number of special testing machines have been developed by Crane Co. Equipment now is available for making creep tests in 22 individually controlled furnaces, 10 of which provide for either 20-inch gage lengths or several shorter gage lengths coupled together, operating in a constant-temperature air-conditioned room. Some of the furnaces are planned to permit study of creep under controlled atmospheres. Direct microscopic measurements of the creep specimens reproducible to 1/20,000-part of an inch are made periodically throughout the test runs lasting thousands of hours.

### Tests at Resonance Frequency

Creep testing equipment is augmented by special relaxation testing devices to check bolt materials. By use of a vacuum tube oscillator, the frequency of the load applied in fatigue testing piping assemblies can be varied from a few cycles up to several thousand cycles per second. By adjusting the frequency of a magnet in this apparatus to the resonance frequency of the test sample, enough force can be applied to fail a sample of considerable dimensions.

By welding gate valves into pipe lines instead of using bolted flanges, the perplexing problem of creep in high temperature bolts can be circumvented in some cases. This development of welded gate valves for

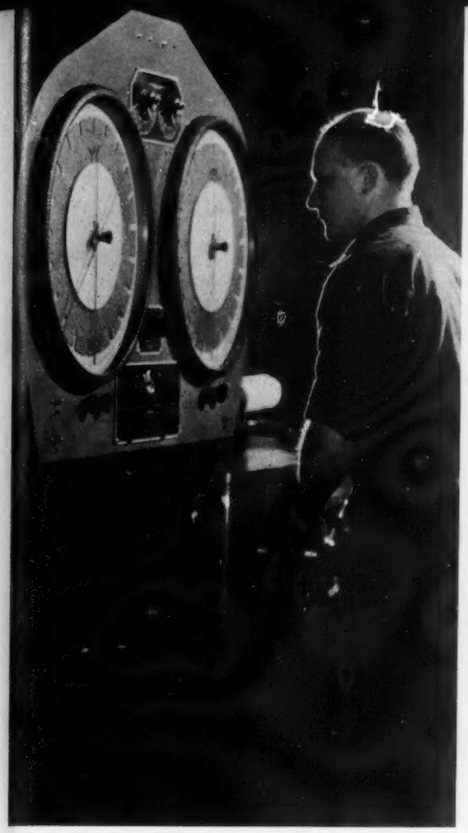


Fig. 1—Stress-strain diagrams come to life on this recording hydraulic testing machine

high-pressure high-temperature service is of comparatively recent introduction. Welding procedure for such work is carefully checked by numerous metallurgcial and mechanical studies.

Considerable investigational work is being conducted on welding the newer alloys, many of which now are essential in steam power, oil refining and various chemical industries. These alloys combined with improved designs of equipment are making it possible to operate power plants and numerous processing units in the chemical field at higher pressures and temperatures, thus gaining advantage of increased thermal efficiency and greater yield.

### Welding Alloys Important

Welding new alloys is especially important in eliminating mechanical joints at elevated temperatures and high pressures. Fusion welded joints require no servicing throughout the life of an installation, provided they are made properly to meet requirements.

The laboratory includes high-frequency induction furnaces for melting and preparing experimental alloys. Since Crane Co. regularly manufactures numerous nonferrous and ferrous alloys, the laboratory plays an important part in control and development work.

One induction furnace is provided for the analysis of gases in metals which can be enclosed in an air-tight shell so melts may be made in a vacuum and the evolved gases from the melts be entrained and determined.

Much development work has been done with alloy steel castings. Use of alloy steel castings and valves for greater strength has emphasized proper heat treating as some of these castings are given double and even triple-step heat treatments instead of the simple anneal usually accorded carbon steel castings. Careful studies of the physical characteristics of many compositions at both high and low temperatures has resulted in the development of a suitable selection of steel which covers the service range from —150 to 1200 degrees Fahr.

It has been found that while the chromium steels in the 4 to 6 per cent range have better characteristics for use at elevated temperatures, certain nickel bearing steel serves better for use at subnormal temperatures. The 4 to 6 per cent chromium molybdenum steel represents a distinct economy over the higher chromium types. The molybdenum addition prevents embrittlement at high operating temperatures, with loss of corrosion resistance. While tungsten has been used for the same purpose, molybdenum appears superior. At extremely low temperatures nickel bearing steels are notable for their great impact resistance. Great improvement in the low-temperature impact resistance of steel is attained simply by adding 3 per cent of nickel and by placing limitations upon the carbon content.

### Many Investigations Under Way

Many other investigations are under way in the Crane laboratory. Most complete facilities are available, including the following: Optical dilatometer, Fig. 2, to record automatically expansion-contraction curves of metals, thus establishing correct heat treatment and making available other valuable information; a number of extremely high-powered metallographic microscopes with photographic attachments for studying grain size and other characteristics; a recording hydraulic testing machine, Fig. 1, which makes available stress-strain diagrams; scoring-of-metals-testing equipment; all types of mechanical testing equipment as required for making tensile, bend, nick break, hardness, Charpy impact and weld density tests; a 400,000 volt X-ray of the portable type, Fig. 5, capable of penetrating 6 inches of steel;

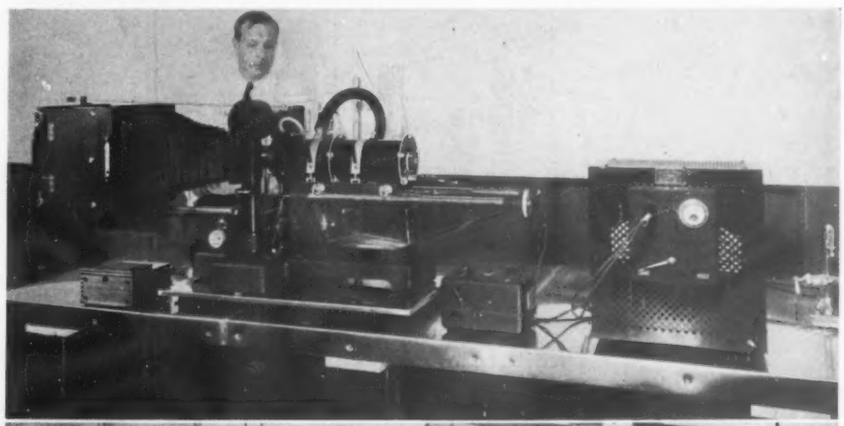


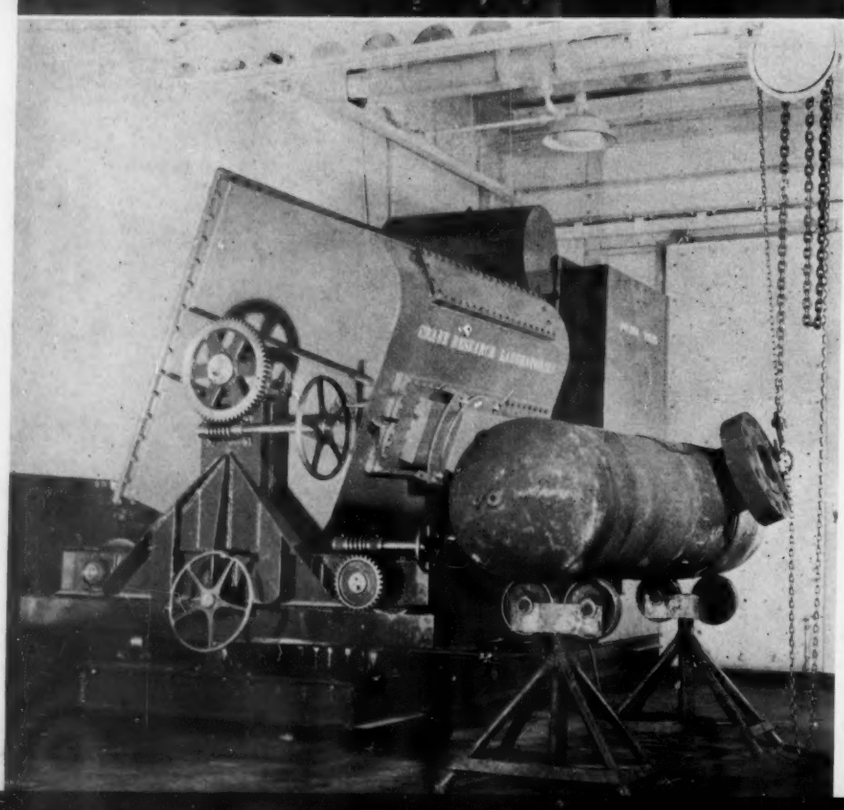
Fig. 2. (Upper)—Here the optical dilatometer furnishes means to study action of metals under heat and helps to set up specifications for heat treatment. Fig. 3. (Lower)—The chemical laboratory provides much essential information

sound meter and analyzer for determining acoustical characteristics of various equipment, Fig. 4, and much other apparatus.

In addition, equipment is available for spectroscopic studies and analysis, X-ray diffraction and crystal structure examinations, electron diffraction phenomena, photoelasticity studies and many other special testing setups. For example, in investigating operating characteristics of brass globe valves, a special machine was designed to operate continuously and automatically such valves to the point of stem thread failure. As result of tests conducted on this machine, average service life of the stem threads in some of the brass valves has increased more than tenfold.

Another special machine duplicates severe service conditions and accelerates test of stuffing box packings to a point where reproducible results may be obtained within a reasonable period of time. This machine tests all available types and makes of packings under identical conditions and determines every important characteristic even to the determination of coefficient of friction between the packings and stems under service conditions.

**Fig. 4. (Upper)—Here a sound meter and frequency analyzer are being used to determine the acoustical characteristics of a pump. Fig. 5. (Lower)—This 400,000-volt X-ray machine provides a seeing eye for nondestructive testing and examination. This unit easily penerates heavy armor plate, large castings, etc.**



# Blower Is Used To Clean Sheets

■ AN INTERESTING application was recently made in a cold-strip mill where compressed air nozzles were being used to blow off grit and scale from sheets before they were passed through the rolls of the cold mill. Capacity of compressors proved to be inadequate for the increasing needs of the job, and it became necessary to obtain an additional supply of compressed air or to find some other methods of removing the scale and grit from the sheets.

A high-velocity blower was found to answer the requirements most satisfactorily. This particular blower employs a screw blade propeller fan beyond which are guide vanes. Some 3000 cubic feet of air per minute is discharged from the blower at a velocity of 4200 feet per minute and is directed onto the sheets. The blast of air has been found to clean the sheets most satisfactorily. Also the blower is compact, self-contained and can easily be moved about as desired.

In addition, the cost of cleaning has been reduced as the motor on the blower is only 1 horsepower and so consumes little power. The unit installed is a No. 250 Vano blower furnished by Coppus Engineering Corp., Worcester, Mass.

## Stainless Non-Ferrous Finish

■ Chromaloy finish, developed by Colonial Alloys Co., Colonial Philadelphia building, Philadelphia, is nonferrous and claimed to be rustproof and non-tarnishable in the atmosphere and to many corrosives. The finish is said to create a hard, close-grained, nonporous protective surface which has unusual adherence and homogeneous molecular affinity for the base metal. It can be formed where the drawing is not severe and is recommended for flat upright surfaces.

Chromaloy is stainless throughout and weighs 66 per cent less than steel. A navy salt spray test of over 630 hours showed little or no effect on either metal or finish.

Chromaloy No. 4 has a soft velvety satin color similar in appearance to the No. 4 finish on 18-8 stainless steel; Chromaloy No. 8 has a high deep chrome mirror color like the No. 8 finish on 18-8 stainless steel. Chromaloy No. 4 and No. 8 are available in a wide variety of sheet sizes and gages, seamless tubes and pipe, rod, angles and castings ready for use without further finishing.

# Reaction Chambers

**All-welded molybdenum-bearing steel fabrications permit shell thickness to be reduced from 3 1-32 to 1 13-16 inches. Total weight of vessels is cut about 40 per cent. To meet code requirements, units are stress relieved and X-rayed**

■ RECENTLY, Babcock & Wilcox Co., Barberton, O., designed and fabricated two reaction chambers for operation at approximately 920 degrees Fahr. and at a pressure of 350 pounds per square inch. Lukens Thermel steel, a molybdenum-bearing steel meeting the requirements of ASTM specification A-204-38, was used.

Due to its high creep strength and superior physical properties at elevated temperatures, as well as its excellent welding qualities, Thermel steel has been employed extensively in pressure vessels such as reaction chambers in petroleum cracking processes.

Each vessel is 8 feet in diameter with overall length of 50 feet and a weight of 118,000 pounds. Shells, heads and cover plates were 1 13/16-inch minimum thickness. The elliptical heads, made to ASME tolerances, were formed in the Lukens flanging department. Stud bolts were of SAE 4140 analysis, also a molybdenum-bearing steel.

### Fusion Welding Used

Each reaction chamber was fusion-welded in accordance with the API—ASME code for unfired pressure vessels, including stress relieving and X-ray examination of all seams.

The shells consisted of five courses, each formed from one plate, butt welded to form the complete shell. Each head was formed from a single plate and welded to the end courses. All body welds were ground flush on both inside and outside. Manways, nozzles and reinforcement pads are forgings, welded to the shells.

Because of the higher allowable stress for Thermel steel than for carbon steel at 920 degrees Fahr., it was possible to reduce the plate thickness from 3 1/32 to 1 13/16-inch minimum gage. Thus, the total weight of the vessels was reduced about 40 per cent.

All welding was done with molybdenum-bearing electrodes approximating the composition of the Thermel steel, including the longitudinal welds on the individual courses, the circumferential welds joining the courses and heads, and the welding of the pads and brackets to the shells.

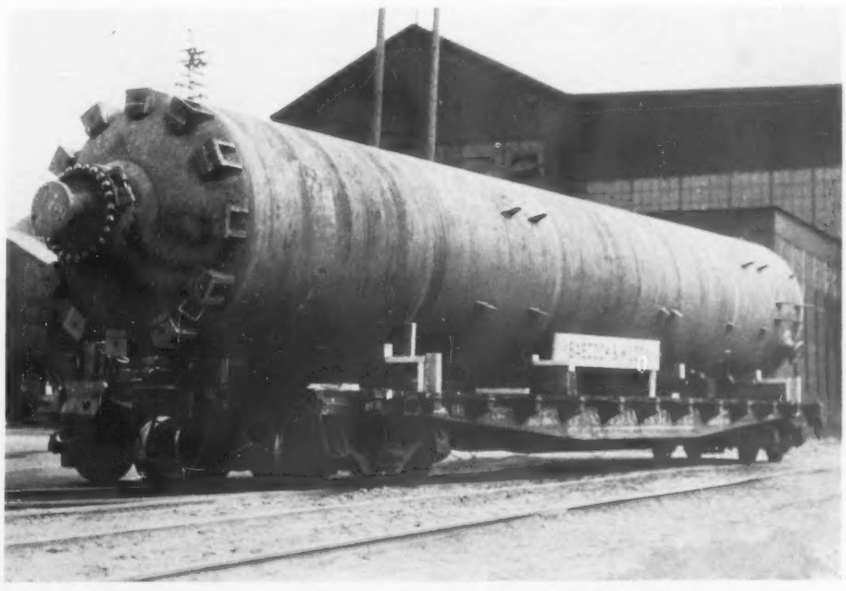
### Stress Relieving Important

Because of the importance of stress-relieving, a careful program was followed after welding. The longitudinal weld on each course was stress relieved at 1200 degrees Fahr., before any of the circumferential welds were deposited. After completion of all welding including pads and brackets, each vessel was completely stress relieved. The treatment involved placing the vessel in a cold furnace followed by bringing the furnace and vessel up to a temperature of 1200 degrees Fahr. over a period of 13 hours.

To determine the properties of the welds and weld metal, two weld test plates were made for each vessel. These test and attached to the longitudinal seams of the No. 1 and 5 courses of each vessel. The test plates were welded at the same time and in the same manner as the longitudinal welds, and given the same stress-relief treatment. The properties, developed in tensile tests are given in Table I.

The results of the bend tests are shown in Table II.

Tests of a specimen of weld metal, machined to 0.505-inch diameter showed the following physical prop-



**One of two petroleum refinery reaction chambers, 8 feet diameter, 50 feet long, welded from alloy steel. Units operate at 920 degrees Fahr. and 350 pounds per square inch**

Abstract from *Lukens Life*, published by Lukens Steel Co., Coatesville, Pa.

**TABLE I**

**Full Section Tensile Test**

| | Vessel No. 1 | Vessel No. 2 |
|---|---|---|
| Dimensions, inches | 1.0 x 1.84 | 1.0 x 1.825 |
| Tensile Strength, p.s.i. | 66,300 | 69,000 |
| Failed in | plate | plate |

**Reduced Section Tensile Test**

| | Vessel No. 1 | Vessel No. 2 |
|---|---|---|
| Dimensions, inches | 1.0 x 1.67 | 0.986 x 1.70 |
| Tensile Strength, p.s.i. | 72,500 | 73,700 |
| Failed in | weld | weld |

**TABLE II**

**Standard Bend Test**

| | Vessel No. 1 | Vessel No. 2 |
|---|---|---|
| Dimensions, inches | 1.45 x 2.15 | 1.75 x 2.33 |
| Angle of bend, degrees | 180 | 120 |
| Radius of bend, inches | 1.5 | 1.5 |
| Elongation, at Outside Fibers | 32.0% | 30.0% |

**Reverse Bend Test**

| | Vessel No. 1 | Vessel No. 2 |
|---|---|---|
| Dimensions, inches | 1.45 x 2.15 | 1.70 x 2.33 |
| Angle of bend, degrees | 160 | 120 |
| Radius of bend, inches | 2.0 | 1.75 |
| Elongation, at Outside Fibers | 30.0% | 31.0% |

erties after stress-relieving for two hours at 1200 degrees Fahr.:

Tensile strength, p.s.i. .....71,750
Yield ponit, p.s.i. .....59,000
Elongation in 2" per cent.... 26.0
Reduction of area, per cent... 57.8
Fracture .....¼ cup

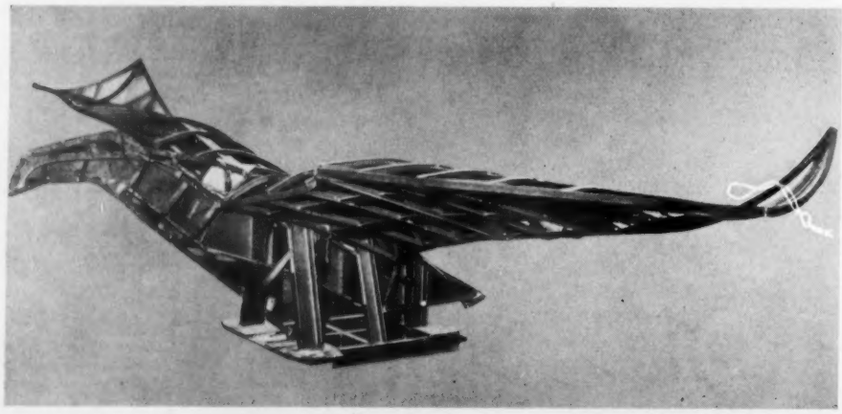
The vessels were also subjected to a series of physical tests to determine their soudness. The tests consisted of a magnaflux test of all welded joints, both before and after stress-relieving, an etch test of all welds, on both inside and outside surfaces, and X-ray test of all welds, and a hydrostatic test of the completed vessels. The weld test showed that the welds were excellent. Both vessels successfully withstood a cold hydrostatic pressure of 858 pounds, and a hammer test pressure of 715 pounds.

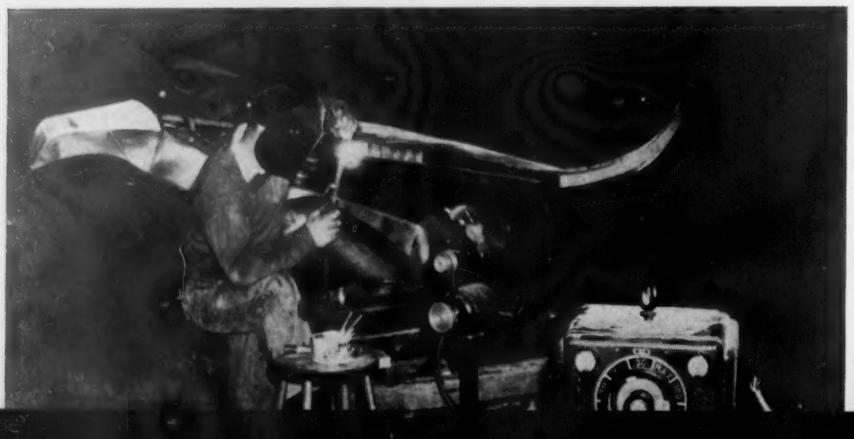
# Light-Gage Stainless Steel Used in Ornamental Eagle

■ AN ORNAMENTAL stainless steel eagle has been made by T. A. & I. W. Beck, 577 Tenth avenue, New York, for the top of the Landplane administration building, North Beach Airport, North Beach, N. Y.

Construction of this eagle with a wing spread of 20 feet and a beak-to-tail measurement of 8 feet entailed the use of 1450 pounds of structural steel in the contour frame structure and 303 pounds of KA-2 Rizistal 22-gage stainless steel to encase the frame. The main body truss and wing members were fully welded with gusset plates of 4-inch 10.5 channels, and all the contour sections were made of 1 x 1 x ⅛-inch T-bar bent and welded to the heavier members.

**Structural steel framework of ornamental eagle (upper) has channel gusset plates in the main body and bent T-bars in contour sections. Operator at work (below) welding stainless steel casing to the framework using carbon arc technique**





In sectioning the stainless steel plating, all flat seams were placed so as to secure a counter stress. Legs of the eagle and the high-crowned surfaces approaching a hemisphere were "orange-peeled," partially cold hammered and welded. Seams then were ground and given a final cold hammering for shape. Flat welds throughout were butted, tacked and fully welded over insulating strips of the same material which were first attached to the structural frame.

All the welds on the outside of the eagle were ground smooth and buffed and the entire eagle was hand-rubbed to approximate the No. 4 finish of the original stock. The carbon arc technique using 150-ampere Senior "Multi-Range" welder made by Hobart Bros. Co., Troy, O., was used in the fabrication. Three dozen 3/16-inch carbon pencil electrodes and 7 pounds of eighteen-eight 5/64-inch coated rod were used to weld 140 feet of flat seam, 170 corner seams and 75 feet of internal angular seams. Power consumption was 395 kilowatt-hours.

## Rust-Proof Fish Hooks

■ The corrosion resistance of a nonferrous alloy and the high mechanical properties of some of the heat-treated alloy steels have been combined to make a new fish hook according to Nickel information bureau of International Nickel Co. Inc., 67 Wall street, New York. The resulting heat treatable nickel alloy, "Z" nickel, contains 98 per cent pure nickel.

Fish hooks made from this metal are rustproof, even in salt water; their mechanical properties, after heat treating, provide them with exceptional strength and stiffness without destroying required ductility.

# *Flexible Connectors*
## *for Service on Heavy Machinery*

**Look over your maintenance costs for leaky joints or inferior hose connections . . . then consider these facts about American Seamless**

Farrel Birmingham molding press using new "American Bracketubes" for conveying steam to platens. They are the most efficient, economical conductors for connecting two moving parts.

TO CONVEY steam, oil, water, air, gases or liquids to moving machine parts requires a reliable flexible conductor with certain time-tested qualities. To avoid production shutdowns and delays, you can't take a chance on second rate articles. So, why not consider these exclusive advantages and properties of American Seamless Flexible Metal Tubing:

**1.** American Seamless is *flexible metal tubing* made from *seamless tubes* of various workable metals. It has no joints, welds, seams or packing of any kind.

**2.** In tests made in independent laboratories with several different types of installations, American Seamless has flexed back and forth literally millions of times without showing signs of failure.

**3.** Reinforcing metal braid increases this flexible tubing's ability to withstand elevated pressures—for example, 1/2" I. D. with two braids tests to a hydrostatic bursting pressure of 5,000 lbs. per sq. in.

The details of this and other valuable engineering information are in a new 24-page manual. Illustrations show typical installations; diagrams accompany installation instructions. There are complete data charts covering sizes, bursting pressures, and bending diameters. Write for your copy now. It will help you to bring about new economies on your conductor-connectors. 39248

ANACONDA

# American Metal Hose

**The** American Metal Hose Branch of The American Brass Company, General Offices: Waterbury, Connecticut

*In Canada: Anaconda American Brass Ltd., New Toronto, Ontario • Subsidiary of Anaconda Copper Mining Company*

# Stamping Plant

**Power truck increases production as it places and removes material at presses, freeing operators from handling work and increasing productive time. Men are relieved of severe handling tasks, reducing fatigue and increasing safety**

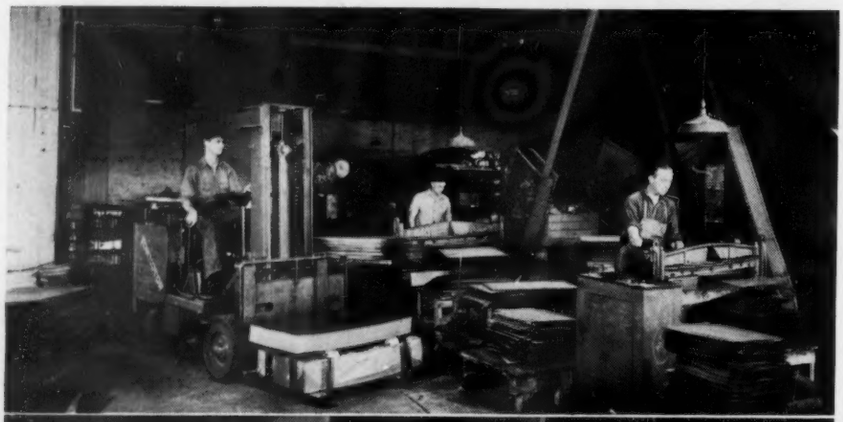
**By W. U. PFAEFFLI**
President and General Manager
Strong Mfg. Co.
Sebring, O.

■ A SHORT time ago increased production requirements made it necessary for Strong Mfg. Co., Sebring, O., to concentrate on faster handling of raw materials through processing and into storage. At the same time it was desired to eliminate all unproductive effort in processing operations where much wasteful moving of work by hand was being done.

The object was to give better service to the customers of this stamping and enameling plant as well as to increase production. Most incoming raw material is hot-rolled enameling steel stock. It comes in sheets varying from 14 to 30 inches in width and from 18 to 45 inches in length. These sheets are strapped in bundles weighing an average of 1000 pounds.

### Heavy Steel Packs Moved

Obviously, the hand work in moving this material, even with hand trucks, was slow and laborious. The men, in fact, were subjected to excessive physical strains. It was important that a mechanical handling system be installed to eliminate severe handling tasks for the men in the plant. Possibly the most diffi-



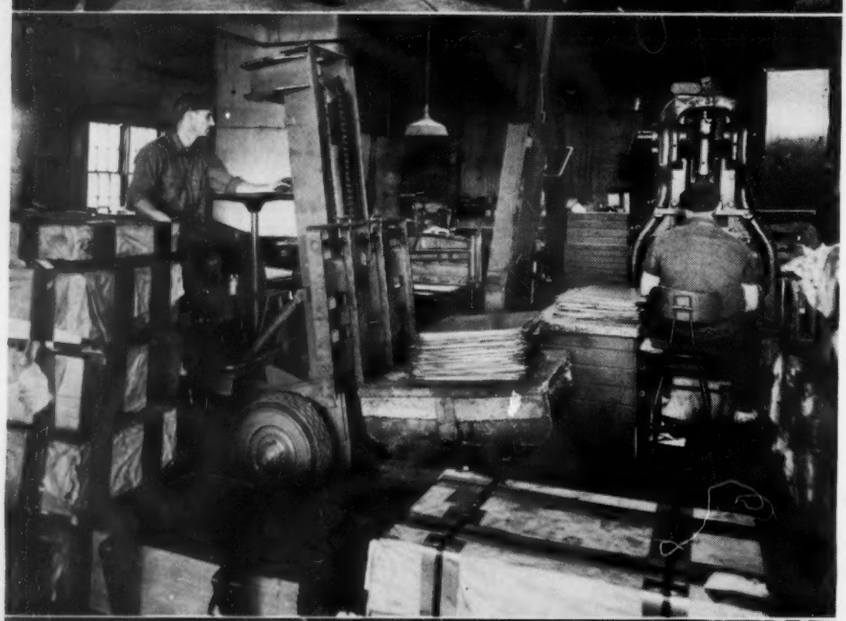


**Fig. 1. (Top)—First step at stamping plant is to unload incoming sheet and place it in stock. Then truck delivers it to shearing line shown here**

**Fig. 2. (Center)—Next sheets are taken to notching presses. Note extremely close quarters in which truck operates**

**Fig. 3. (Bottom)—Wood skids facilitate moving and placing of sheets within easy reach of operator at the drawing presses**

# WORLD'S LARGEST MURAL

## . . . . enameled on YOUNGSTOWN SHEETS

Designed by J. Scott Williams (under commission from New York World's Fair), ground coated at Toledo Porcelain Products, and translated into polychrome porcelain by the artist Daniel Boza of Bomat, Inc. at the Cleveland Art School for Ferro Enamel Corporation, this beautiful contribution to both pure art and architecture comprises the best skill of many artisans. Significantly, Youngstown Sheets were chosen as the foundation for this critical piece of exhibition work at the New York World's Fair's Home Furnishings Building.

Youngstown Enameling Sheets are of such high quality that the regular production could be used even for this most exacting work -- there was no need to make any special selection of sheets. That's because Youngstown treats all enameling sheets as an important specialty, makes them under conditions which are known to produce the best results. Youngstown Enameling Sheets are free from inherent strain, free of gas inclusions, their finish is uniform, and excellent adherence is possible with their evenly etched surface.

Whether you are designing for ordinary applications or an exceptional use like this, you, too, will achieve the desired appearance and long life by specifying Youngstown Enameling Sheets.

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Sheets - Plates - Tin Plate - Pipe and Tubular Products - Conduit - Bars - Rods - Wire - Nails - Tie Plates and Spikes.

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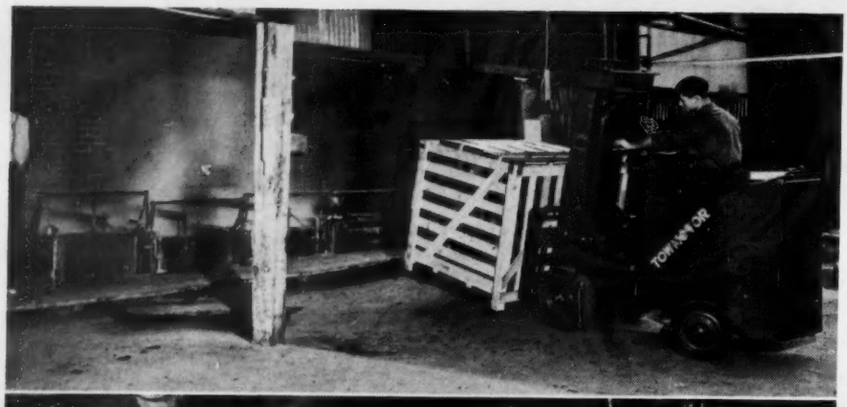
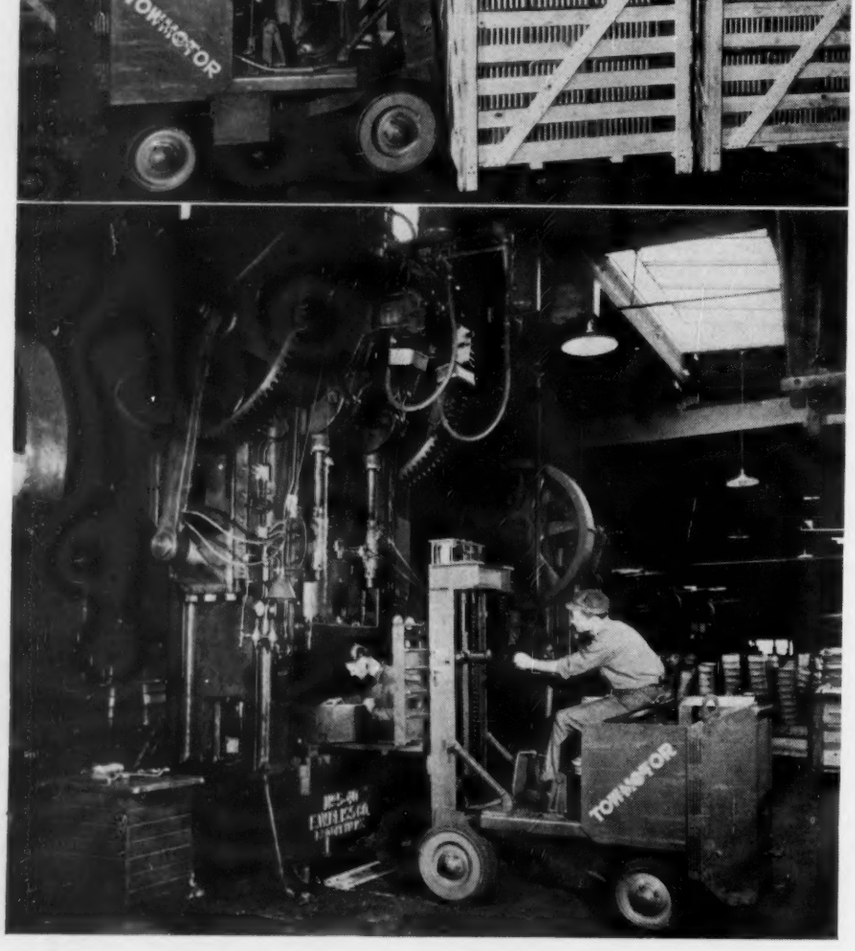
THE
YOUNGSTOWN
SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO






cult job was moving the heavy steel packs from storage to shearing.

A gas-powered lift truck was adopted primarily to take over this particular task. Its use proved to be a great help to the men in the plant. Soon, however, it was found that the same lift truck could be used efficiently in moving sheared sheets from the shearing machines to the notching presses on wooden skids. This proved to be another aid in eliminating unnecessary strain on part of workmen as well as avoiding delays. But that was not all.

Also in this plant is quite a battery of draw presses to which this same steel must go after leaving the notching presses. Naturally it did not take long to extend the efficient handling from notching presses to draw presses. In spite of the fact that layout of the plant is not well suited to this type of mechanical handling, it is accomplished by using a small compact Towmotor type lift truck which can maneuver in close quarters and through narrow aisles without loss of speed. This is a type that makes short pivot turns on either driving wheel and is built with two speeds in both forward and reverse.

### Wood Skids Used

Fig. 1 shows a typical load being taken from storage to shearing machines where the operators can pick up the sheets from the stack one at a time just as they are set down by the truck. Truck operation in close quarters is perhaps best illustrated in Fig. 2 where the steel is conveyed from shearing to notching operations. In transporting material from the notching presses to the draw presses shown in Fig. 3, the same type of wood skids are used. In all cases the material is placed conveniently for the operator.

Because of added smoothness in operation, the hydraulic type of lift is employed. Forks are used as pickup adaptors so the same truck can handle parts in process on skids, pallets or crates. In addition it can pick up and handle strapped steel from storage.

The pickling room happens to be

(*Please turn to Page* 80)

**Fig. 4. (Top)—Crateload of stamped and formed pieces being delivered to pickling room in preparation for enameling**

**Fig. 5. (Center)—Flaring metal ears at top of crates facilitate stacking as operator does not need to be fussy about positioning crates**

**Fig. 6. (Bottom)—Large number of heavy dies must be moved about. The power truck makes this an easy job. Hydraulic lifting mechanism permits accurate placement of dies in presses with no backbreaking effort**

# No "SCENIC RAILWAY" PRESSURE HERE!

## STURTEVANT CENTRIFUGAL COMPRESSORS

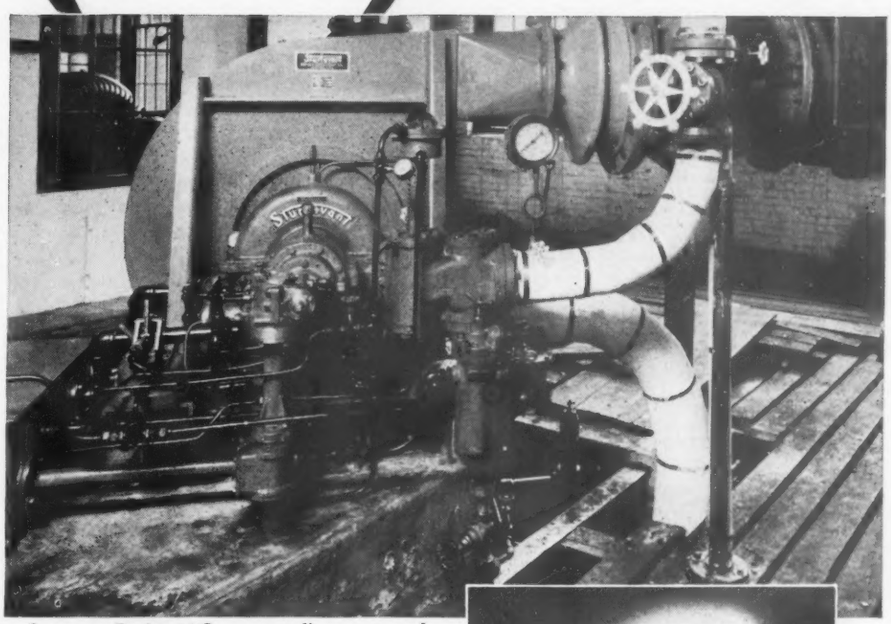
### assure constant pressure over practically complete volume range

YOU DON'T have to fuss around with valve adjustments to maintain required pressure, when operating a Sturtevant Centrifugal Compressor under variable loads. It automatically maintains pressure over practically complete volume range.

Volume automatically adjusts itself to demand. And power consumption decreases proportionately with decrease of volume.

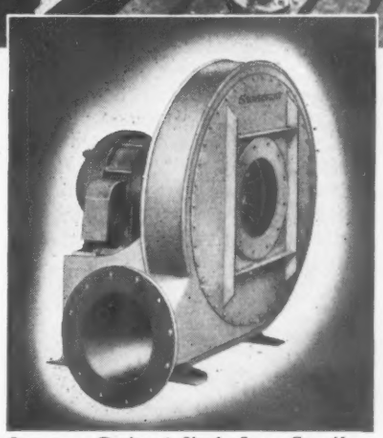
Other important features of these Sturtevant Centrifugal Compressors, which make them ideal for industrial duty, are:

1. Simple, compact design — overhung wheel construction, commonly used, eliminates two bearings and coupling. Saves space; reduces maintenance.
2. Requires Minimum attention—lubrication of motor bearings two or three times yearly only care required. Skilled operators unnecessary.
3. Lifetime efficiency—only parts in contact are motor bearings; there are no close clearances. Therefore, wear reduced to a minimum and lifetime efficiency maintained.



Sturtevant Design 14 Compressor direct connected to Sturtevant Steam Turbine—installed in plant of Consolidated Gas Company, Everett, Mass.

Entire unit is very compact; occupies minimum floor space.



Sturtevant Design 9 Single Stage Centrifugal Compressor direct connected to electric motor.

B. F. STURTEVANT COMPANY
Hyde Park Boston, Massachusetts
*Sales Offices in 40 Cities*
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Contains complete information regarding Sturtevant Centrifugal Compressors and their many advantageous features which assure excellent compressor performance, very high efficiency, and low maintenance cost.

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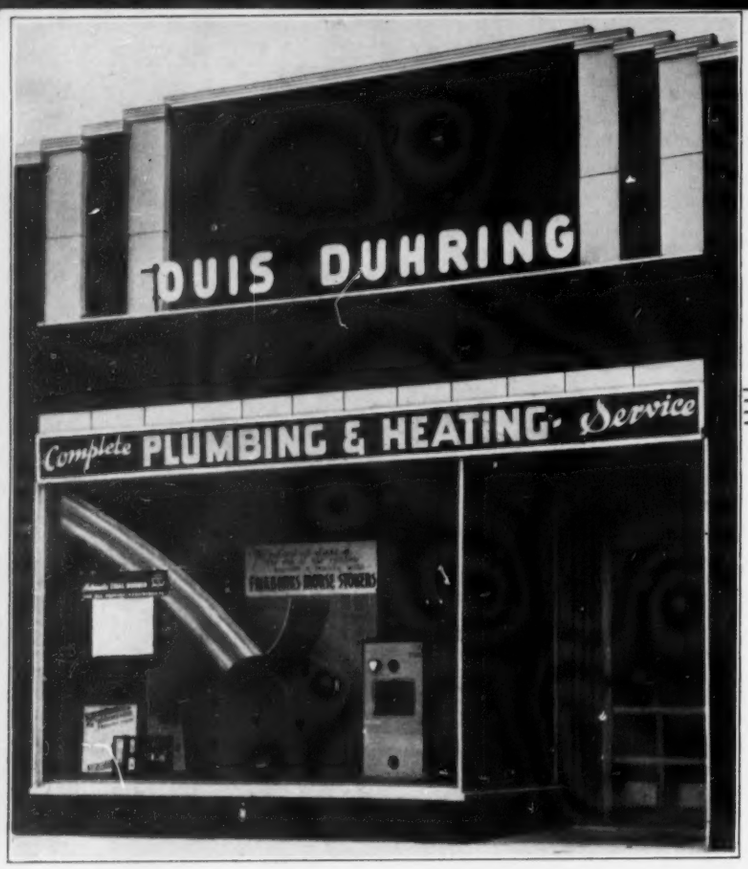
*Puts Air to Work*

**WORLD'S LARGEST MAKER OF AIR HANDLING EQUIPMENT**

# PORCELAIN ENAMELED *Business Facades*




■ THREE HUNDRED square feet of Armco enameling iron were used for the store front of Duhring Plumbing Co., Lincoln Park, Mich., above. Enameling was done by Wolverine Porcelain Enameling Co., Detroit. At right, Knapp's store, Lansing, Mich., covered with porcelain-enameled iron supplied by Davidson Enameling Co., Clyde, O.

Left below, Majestic theatre, Detroit, has porcelain enamel front decorated with chinese red, Glasiron light yellow, light blue, light-green macotta, ornamentation with three-color stencil, base course of dark blue Glasiron macotta, and Ashlar units edged with stainless steel. Below upper right, Gernhardt's Store, San Francisco; below lower right, a substation of Union Gas & Electric Co., Middletown, O. Illustrations courtesy *The Ceramic Forum*, 209 Fourth avenue, Pittsburgh.

# Baking and Drying

**Factors for low-cost operation of gas-fired baking and drying ovens are detailed and data given for calculating heat requirements of recirculating type ovens. Direct-fired gas air heaters recommended as most efficient units**

By JAMES E. DARE
Public Service Co. of
Northern Illinois
Streator, Ill.

■ MODERN finishing operations involve an ever-increasing amount of work with the newer lacquers, synthetic enamels and varnishes of various types which require drying and baking at temperatures ranging from 250 to 400 degrees Fahr. This is generally known as low-temperature oven work as it is below a maximum of 600 degrees Fahr.

Due to its great convenience, ease of accurate control and other advantages, gas has been widely employed for such heating applications. However, there are a number of factors which must be given due consideration if maximum efficiency and lowest possible fuel costs are to be obtained. Properly designed gas-fired baking and drying ovens may actually lower the cost of the finished product, at the same time increasing its quality and decreasing processing time. However, this involves careful calculation of heat requirements, a knowledge of various types of gas-fired air heaters and ovens available, with complete knowledge of methods of insulating to minimize loss of heat. Equally important is full provision against fire and explosion where volatile thinners are to be removed.

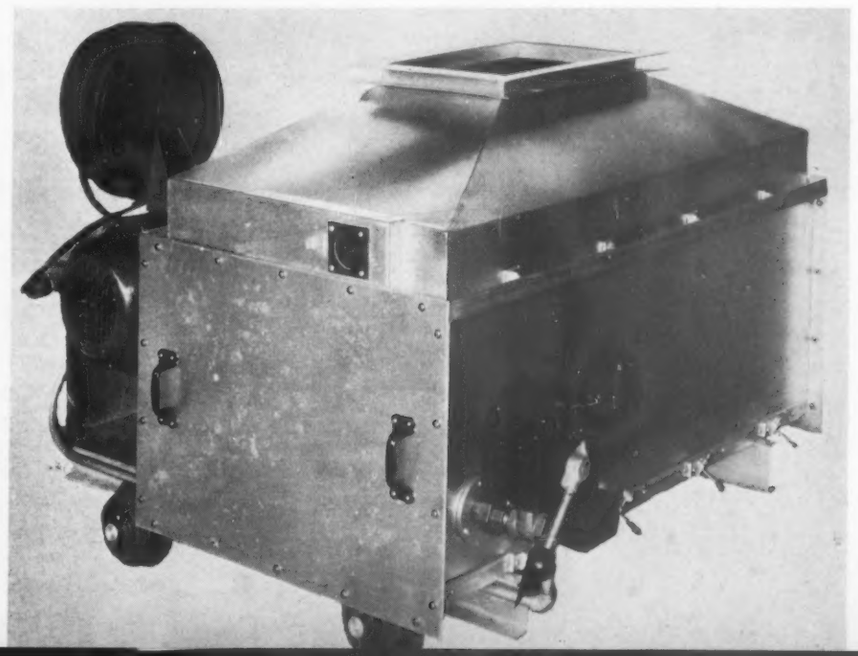
In calculating heat requirements, it is necessary to know heat loss from conveyor, trucks, racks, etc.; heat loss from oven walls, roof and exposed ducts; heat absorbed by oven walls, roof, etc.; heat required for work including water or volatiles evaporated. The above items are usually not difficult to determine because of standard formulas, tables and graphs available.

However, when it comes to calculating heat loss for oven ventilation, especially in a recirculating system, little information appears available. First to be considered is whether water or volatile flammable thinners are to be removed. For a process where no such thinners are evaporated, the exhaust can be assumed to be equal to the input volume of gas plus the air required for combustion. For a process where these thinners are to be evaporated, from 3300 to 9000 cubic feet of heated air must be exhausted from the oven per gallon of thinner evaporated. Amount of air depends on efficiency of circulation and heat distribution. After the amount of air for ventilation has been determined, heat loss from this cause can be determined through use of air heat-content curves.

The total heat requirements and operating temperatures determine the volume of air to be heated. It is considered good practice to use the greatest number of air changes per hour at the lowest air-temperature possible for the particular work at hand because the greater the number of air changes, the greater the uniformity and the faster the baking or drying operation can be performed. Circulating hot air will transfer heat faster to the material than still air. Anywhere from 10 to 80 changes per hour are in common use today.

### Heater Size Data

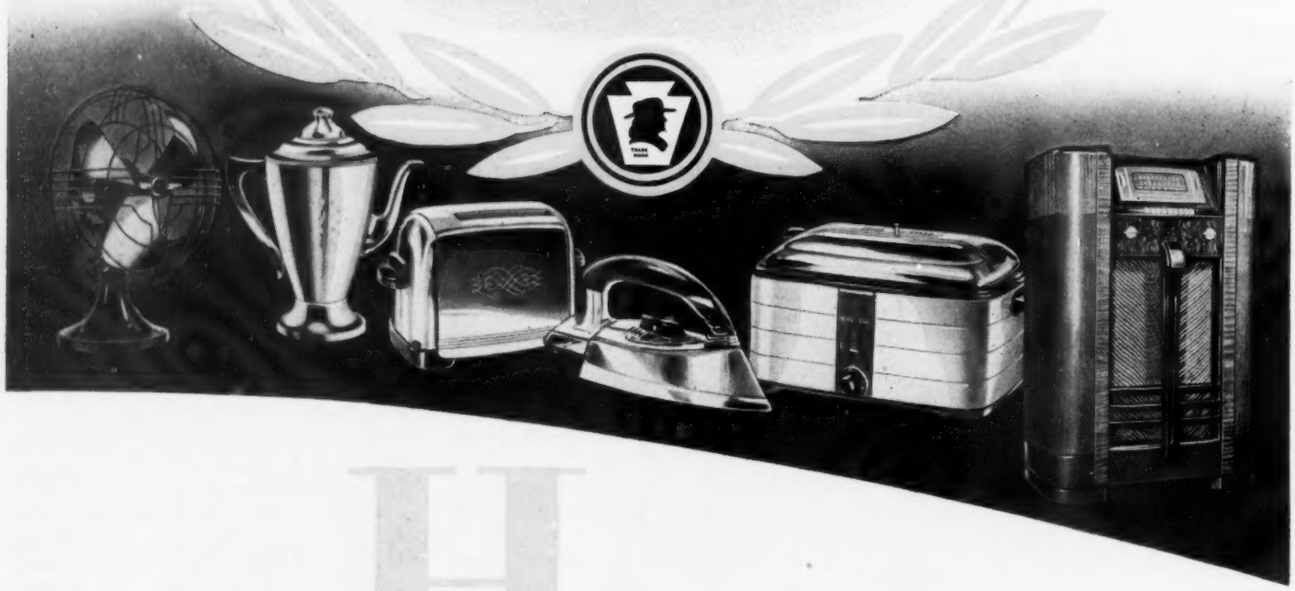
The following data will help in checking the heater size selected: For baking paint at 350 degrees Fahr. using a direct-fired, recirculating system, about 700 B.t.u. per cubic foot of oven volume should be allowed. For drying paint at 180 degrees Fahr. in a recirculating system, only about 220 B.t.u. per cubic foot of oven volume is necessary. For baking enamel at 350 degrees in a direct-fired nonrecirculating system, about 800 B.t.u. per cubic foot of oven volume should be allowed. However, if the enamel is baked at 350 degrees in a recirculating-type system, about 500 B.t.u.



**This unit is a direct-fired line burner, also used as a multipost air heater. Illustrations courtesy Industrial Gas section, American Gas association, 420 Lexington avenue, New York**

# PENNSALT CLEANERS

## CUT CLEANING COSTS OF STEEL, BRASS, ZINC, AND ALUMINUM PARTS FOR LEADING APPLIANCE MANUFACTURER



HOUSEHOLD ELECTRICAL APPLIANCES, from refrigerators and washing machines to percolators and curling irons, are produced by this prominent manufacturer and sold throughout the nation. Parts in all of these products are cleaned before finishing operations with the help of Pennsalt Cleaners.

In building home laundry equipment alone, the metal cleaning problems involve such varied operations as cleaning oil or grease, or both, from hot and cold rolled steel, cast iron, aluminum castings, and zinc die castings... prior to such finishing operations as granodizing. The Pennsalt Cleaners used have eliminated several dipping jobs, and have effected appreciable savings in cleaning materials.

Pennsalt Cleaners are also used by this manufacturer to clean steel parts for radio chassis and speaker frames before bright zinc plating; to clean steel and brass parts for percolators, toasters, and similar appliances prior to bright nickel plating; and to prepare the steel of refrigerator cabinets for enameling. 85% of

all the metal parts that require cleaning are processed with the help of the Pennsalt Cleaners . . . a policy adopted only after careful tests had shown the effectiveness of a particular Pennsalt Cleaner for each operation.

One of the Pennsalt Cleaners is Orthosil . . . a product that in the short space of three years brought outstanding economies to heavy-duty metal cleaning operations in virtually every industry. Companion cleaners have been developed for varied and extreme requirements, forming the present group of Pennsalt Cleaners that meet every need with laboratory precision.

They have exceptional dissolving and emulsifying action, tremendous lasting power, and the ability to do a uniformly quicker, more thorough cleaning job, providing excellent surface finish at exceedingly low cleaning cost. These are the advantages that one or more of the Pennsalt Cleaners offer in your own operations. The extent to which they have already earned the confidence of leading manufacturers indicates what you may expect from a test in your own plant. We will gladly furnish full details. Write today to Dept. S. Pennsylvania Salt Manufacturing Company, Widener Building, Philadelphia, Pa.—New York • Chicago • St. Louis • Pittsburgh • Tacoma • Wyandotte.

PENNSALT

CLEANERS FOR INDUSTRY

*Other Pennsylvania Salt Chemical Products used in large quantity by industry.*

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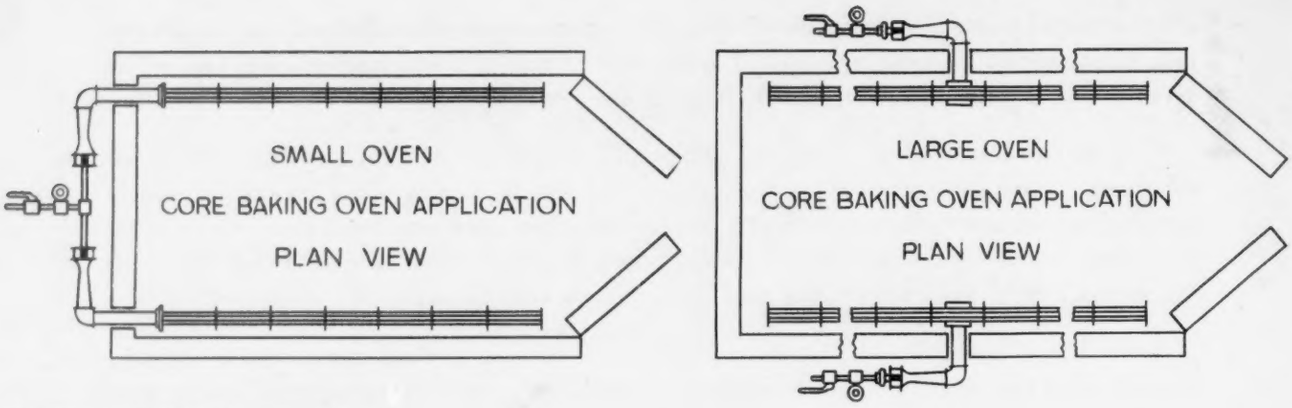
- Mineral Acids
- Carbon Tetrachloride
- Kryolith
- Sal Ammoniac
- Caustic Soda
- Soda Ash
- Acid-Proof Cements

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals




**Showing application of multiport flame-retention nozzles. At left, straight type assemblies fed at one end by high pressure inspirators or blower pipe mixer, and designed for small or medium size ovens. At right, Tee mixers, fed in center by high pressure inspirators or blower type mixers and suitable for large ovens. Multiple Tee assemblies are recommended where lengths involved exceed 10 feet**

per cubic foot of volume is enough.

In considering the various types of air heaters available, the three most common include those with direct-fired refractory combustion chamber, with direct-fired line burner and indirect-fired radiator.

In the first type, gas is introduced through a low or high-pressure inspirator, premix blower or nozzle mixing burner into an inside refractory combustion chamber. This chamber allows rapid expansion during combustion resulting in high gas-burner efficiencies in that the flame is protected from the cooling effect of the recirculated air, or cold inlet air in the case of a nonrecirculating heater.

After combustion is complete, the products are mixed with the fresh air and recirculated air under positive control. Heated air then is delivered to the ducts properly arranged in the oven through use of a circulating fan located at either the heater inlet or outlet.

Air heaters are available for either "push through" or "pull through" operation. "Push through" heaters should be selected where a large temperature rise through the heater and a high discharge temperature are desired and operation is against a small, static back pressure. "Pull through" heaters are used where a small temperature rise through the heater and a low discharge temperature are desired with operation against a high, static back pressure. All heaters have connections for recirculated air, or fresh air inlet with damper control.

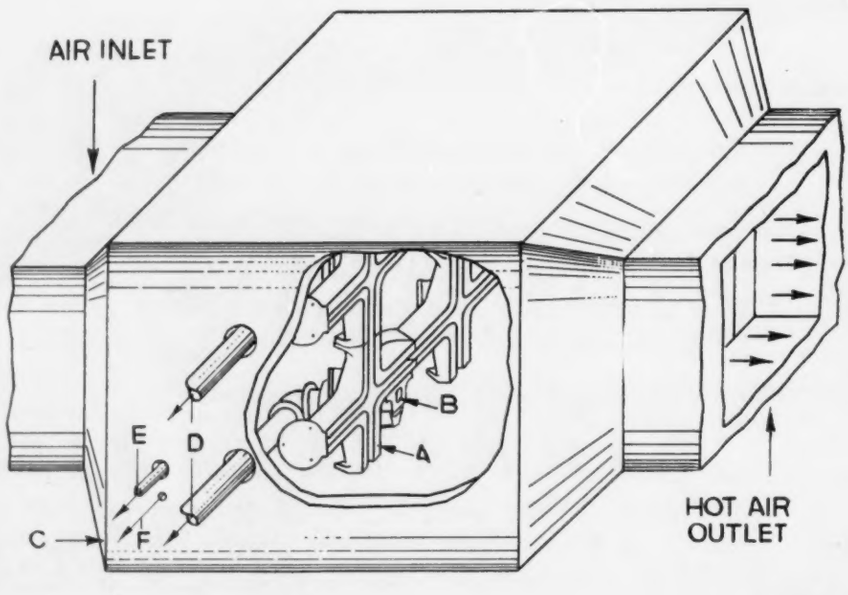
In the second type or direct-fired line burner, an air-gas mixture from a premix blower or high-pressure inspirator is delivered to a line burner or multiport burner enclosed in an insulated steel housing. The circulating fan draws recirculated or fresh air around the line burner in a "pull through" type of heater and delivers the hot air to the oven duct work. The "push through" type of line burner air heater also can be obtained.

### Full Safety Equipment Available

Both the above types of air heaters are available with full safety equipment including electric spark ignition, time-delay switch to allow time for heater and oven to vent, start-and-stop switch, air-pressure switch to gas burners to insure air flow, air-flow switch to insure air flow from the main fan, pilot flame protection device, pilot safety gas valve, main safety gas valve and panel board for mounting.

In the third type or indirect-fired radiator, an air-gas mixture from a low or high-pressure inspirator, premix blower, etc. is delivered through a pipe or line burner or special combustion chamber in the form of a radiator. The products of combustion are exhausted from the radiator without being mixed with the air in the oven so the system is entirely indirect, depending on the heat transfer from radiator surface to incoming air by radiation and convection. Circulation in the oven itself is obtained by a separate fan or natural draft.

There are few applications where a direct-fired gas air heater cannot be used. Where an indirect heater is considered necessary for safety with volatile flammable thinners, this need not be the deciding factor since in a direct-fired oven, highly explosive concentrations of thinner vapors cannot normally be reached because the heater flame immediately ignites any flammable vapor while near the lower explosive limit and before it can reach a highly explosive concentration. For maximum efficiency, the direct-fired recirculating type of heater should always be employed. For this reason, this type of unit will be found most widely standardized by oven makers.




**Direct-fired gas air heaters such as the design shown here are most efficient from a fuel consumption standpoint**

# LESS COST PER TON OF STEEL ROLLED.

TIE PLATE ROLLS MADE FOR CIA F UNDIDORA DE FIERRO Y ACERO DE MONTERREY, S. A.

Not "Jacks-of-all-trades" but *Masters* of one are the makers of the world-famed Phoenix Rolls. That's why Phoenix Rolls serve better and longer, cut mill costs to the minimum.

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# PHOENIX ROLLS

PITTSBURGH ROLLS DIVISION of BLAW-KNOX CO.—*"Steel's Partner"*
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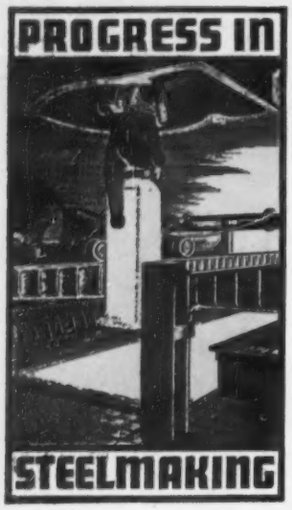



# Rebuilding Stacks

**Heat-resistant cement applied with a gun to corroded steel stacks permits them to be rebuilt economically and without removing the stack from service. Work is done rapidly and is not complicated**

■ RECENTLY a method has been developed for reconstructing steel stacks with a cement gun. The method is essentially that of placing a concrete stack with a corrosion and heat-resistant lining around the existing steel shell. This then provides a new self-supporting concrete chimney which will be serviceable after the old steel stack has been rendered unsafe by continued corrosion or oxidation.

A number of advantages accrue. First, it is not necessary to wreck the old stack. The only prefabrication required is the preparation of reinforcement and assembly of an anchorage ring. Materials needed are available at all steel mills without delay.

Second, the stack is in service without interruption during rebuilding. This often may be extremely important. Third, speed of construction also is a feature. While the method is rapid in itself, probably of most importance is the fact that there is no service interruption.

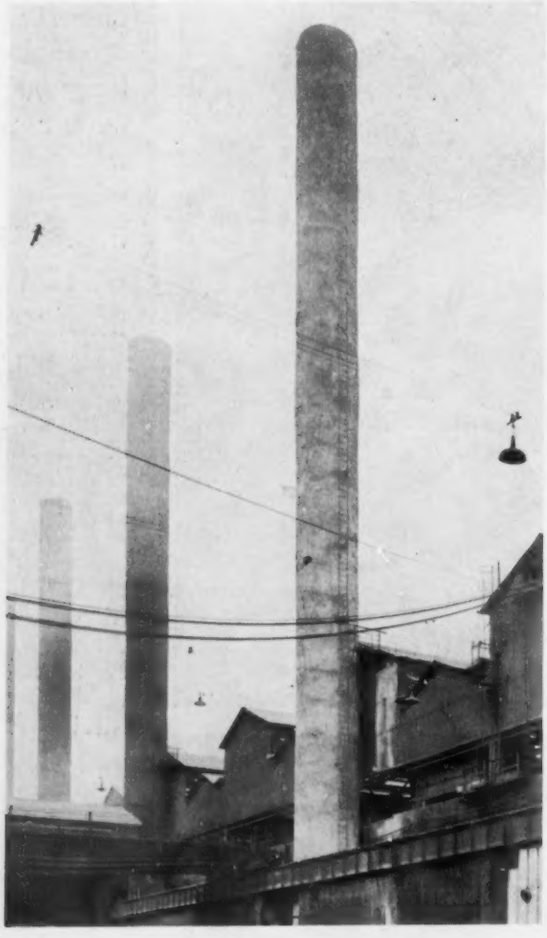


Fig. 1—Stack rebuilt by new method at open-hearth plant of Jones & Laughlin Steel Corp., Aliquippa, Pa., is 180 feet high. Diameter at top is 9¼ feet; at bottom, 15½ feet

The linings are integral, a special coating being placed over the old steel stack prior to placing the structural gunite. This inside coating, or lining, provides a corrosion resistant and heat resistant surface for the new concrete stack. The special coating consists of a calcium aluminate cement (Lumnite) mortar made with a special aggregate.

Method of construction employed is as follows: First, a ¼-inch thickness of asbestos felt is placed around the old steel shell. The asbestos is applied directly to the steel with paper hangers' paste. One reason for the asbestos is to prevent rapid drying out of the mortar when shot on against the warm stack. With hot stacks it is advantageous to reconstruct while in service because the gunite then is applied with the steel shell at maximum expansion.

### Mesh Reinforces Mortar

Second, reinforcing mesh with 2-inch squares is placed and a 1 to 1½-inch coat of Lumnite mortar shot on with a cement gun. The mesh is held in place by wires wrapped around the asbestos. Tie wires are fastened to the mesh extending away from the stack for later attachment to the principal reinforcement. This coating serves as the lining of the new concrete stack.

The Gary and Aliquippa jobs differ in respect to the aggregate used with Lumnite. The Gary stacks carry low temperature exhaust gases. A corrosion-resistant lining was desired, but insulation was not a factor. In this case trap rock screenings were used, the proportions being approximately 3 cubic feet of trap rock to one bag of Lumnite.

At Aliquippa, the stack carried relatively hot gases from an open hearth furnace. An insulating heat-resistant lining was desired. A processed light-weight clay-refractory aggregate, Haydite, was used.

The lining coat is cured by sprinkling with water for several hours after the cement has set. This type of cement is quick-hardening and acquires full strength within 24 hours after mixing.

Third step, reinforcing rods and mesh are placed for the main concrete shell. Reinforcement is anchored to the concrete foundation by a special method so the resulting concrete stack is self-supporting. A complete system of reinforcing is used as designed for a self-sustaining gunite stack. Reinforcing bars are threaded and bolted to the angle-iron frame, throwing the stresses in the chimney steel directly into the anchor bolts. The tie wires previously attached to the first mesh are fastened to the rods.

### Gun Stays on Ground

Portland cement and sand gunite are shot on, forming the structural shell of the finished concrete stack. Cement gun is kept on the ground at the base of the stack at all times. The mixture is elevated to full height of stack through a hose to the nozzle.

At Gary steel works of Carnegie-Illinois Steel Corp., two stacks at the electric power station and one stack at blower engines were reconstructed by this method. Height of these was 92 feet; diameter at top 9 feet; at bottom, 13½ feet. Each was on a concrete base, 9 feet above grade. Details of construction included ¼-inch asbestos felt, 1-inch Lumnite trap-rock lining, and a gunite layer measuring 3 inches thick at top and 6 inches thick at bell. These latter dimensions do not include the Lumnite coating. This reconstruction work was completed August, 1939, by Cement Gun Co., Allentown, Pa.

Fig. 2 shows the outer steel surface of the corroded stack covered with asbestos felt and 1 inch of Lumnite trap-rock gunite. The Lumnite gunite was reinforced with wire mesh. The asbestos felt blanket and reinforcing mesh for lining can be seen at top of the illustration.

Fig. 3 shows the stack with Portland cement-sand gunite, reinforced with rods and mesh, applied after the Lumnite layer had cured. Stacks in Fig. 2 and 3 are at Gary works, Carnegie-Illinois Steel Co. The rods and mesh are the principal reinforcing members of the structural shell.

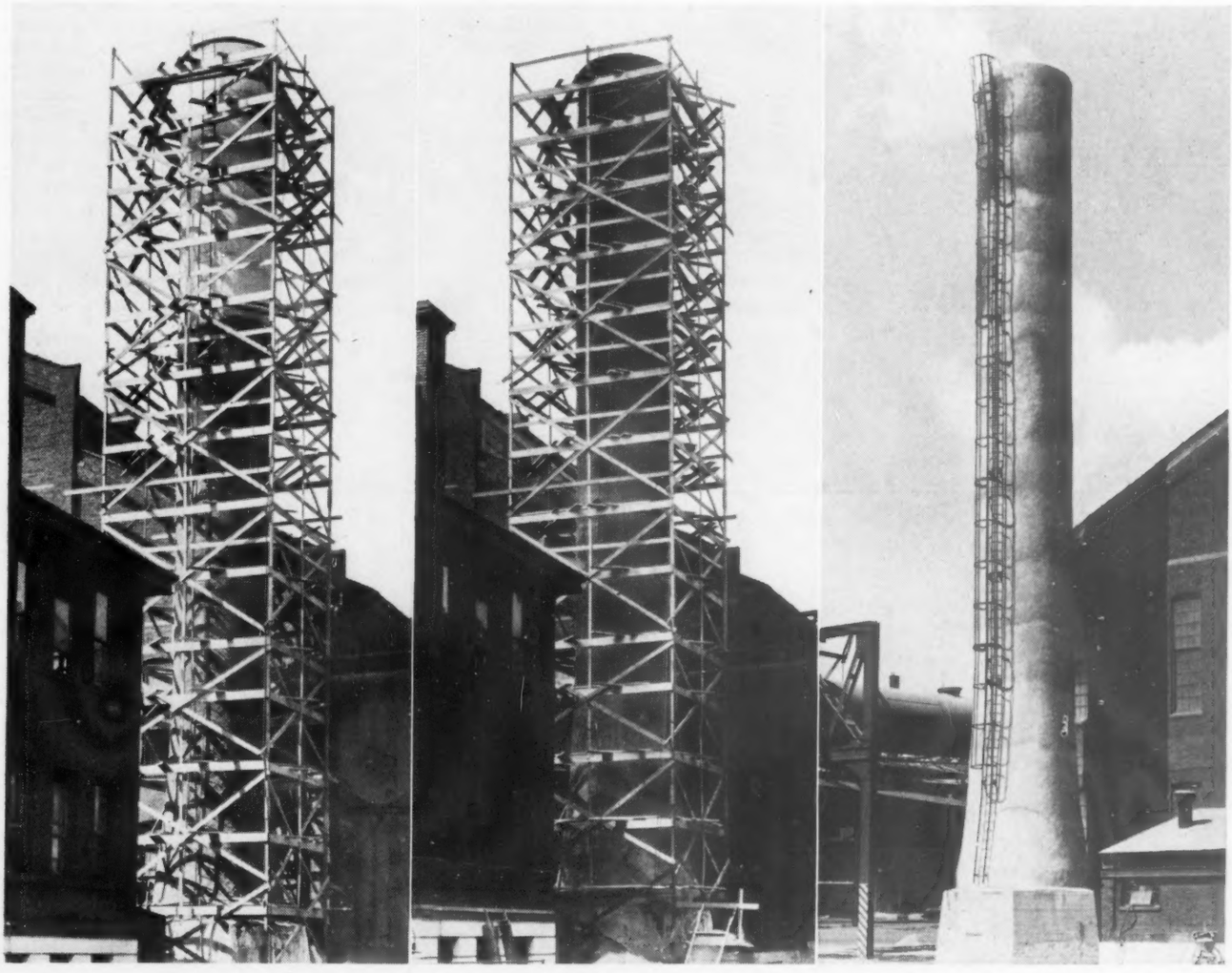
**Fig. 2. (Left)—One of three millhouse stacks reconstructed at Gary, Ind., works of Carnegie-Illinois Steel Corp. After covering steel with asbestos felt, 1-inch of Lumnite trap-rock gunite was applied on wire mesh reinforcement. Fig. 3 (Center)—Portland-cement sand gunite, reinforced with rods and mesh, applied after Lumnite-gunite cured. Fig. 4. (Right)—Completed stack, essentially a concrete chimney with Lumnite lining built around old steel stack**

### Asbestos Lining Used

Fig. 4 shows a completed stack which is essentially a concrete chimney with Lumnite lining. It was built around the old steel stack without interruption of service.

At Aliquippa works of Jones & Laughlin Steel Corp., a stack at the open hearth plant was reconstructed. See Fig. 1. This unit was 180 feet high with a 9¼-foot diameter at top and 15½-foot diameter at bottom. In reconstructing, a ¼-inch layer of asbestos felt first was applied over which a 1-inch layer of Lumnite-Haydite lining was placed. This was followed by the gunite

(*Please turn to Page* 80)



# Passenger Coach

**. . . has sheathing arc welded in place with minimum bulging and distortion by use of intricate welding sequence and stagger system. All-welded bolsters are assembled in rotatable jig which permits downhand fillet welding**

**By A. E. KATZ**
Welding Engineer
National Steel Car Corp.
Hamilton, Ont.

■ IMPROVED methods of fabrication and design have permitted saving of about 40,000 pounds on standard railroad coaches built by National Steel Car Corp. for Canadian Pacific Railway Co. Light weight of the superstructure obtained by welding permitted use of 4-wheel instead of 6-wheel trucks. This, with the light weight of interior finish such as seats, trim, etc., produce a coach weighing only 110,000 pounds, yet no high-tensile alloy steels are used in any portion.

A highly refined fabricating procedure is employed. The light-weight welded center sill is made up of two Z-bars welded together at the toes. Each bar is 77 feet 6½ inches long and requires 60 per cent penetration at the weld due to chamfer on underside of sill which limits amount of welding from that side. Z-bars are set up in a jig and wedged to proper camber before welding. Three operators weld the sill in 60 minutes, using 14 pounds of electrode, while fitters are setting up a second sill on an adjacent jig. Expansion cracks were overcome by using three operators working simultaneously.

Side sills, two per car, consist of an angle bar and Z-bar of same length as center sill and welded together.

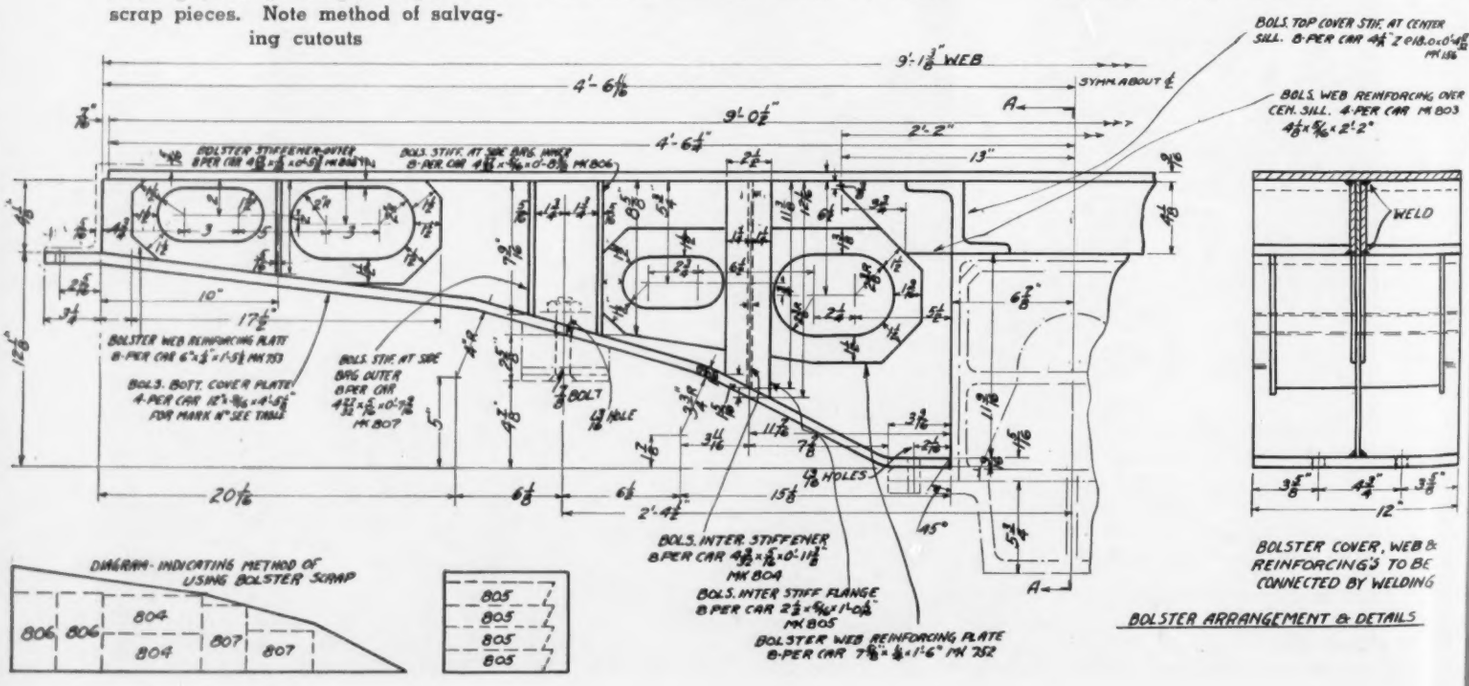
Bolsters are all welded as shown in the accompanying illustration. They are built up from steel pressings, shapes and scrap pieces. Assembled into a positioning jig, the work is rotated to permit fillet welding of all parts in a downhand position. Placement of bolster parts in the jig is such that top plate of bolster is concave when jig is tight. On releasing the jig after welding, the bolster becomes perfectly straight due to relief of stresses. Two operators assemble and weld the bolster in 10 hours 30 minutes using 41 pounds of ¼-inch electrode.

Remaining components of underframe include 25 floor beams of light channel members, two end sills of builtup sections, two steel platform castings and an arrangement

(*Please turn to Page* 81)

Abstract from paper receiving $508.77 award in $200,000 Program sponsored by James F. Lincoln Arc Welding Foundation, Box 5728, Cleveland.

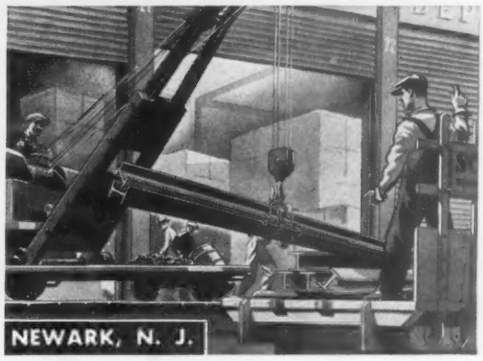
**Bolsters are made entirely by arc welding steel pressings, shapes and scrap pieces. Note method of salvaging cutouts**


9'-1⅞" WEB
4'-6⅛"
SYMM. ABOUT ℄
9'-0½"
4'-6¼"
2'-2"
13"
BOLSTER STIFFENER-INTER 8 PER CAR
BOLS. STIFF. AT SIDE BRG. INNER 8 PER CAR
BOLS. TOP COVER STIF. AT CENTER SILL. 8 PER CAR
BOLS. WEB REINFORCING OVER CEN. SILL. 4 PER CAR MK 803
BOLSTER WEB REINFORCING PLATE 8 PER CAR
BOLS. BOTT. COVER PLATE 4 PER CAR
BOLS. STIF. AT SIDE BRG. OUTER 8 PER CAR
BOLT
HOLE
HOLES
WELD
20⅛
6⅛
15⅛
45°
BOLS. INTER. STIFFENER 8 PER CAR MK 804
BOLS. INTER STIFF FLANGE 8 PER CAR MK 805
BOLSTER WEB REINFORCING PLATE 8 PER CAR MK 752
DIAGRAM INDICATING METHOD OF USING BOLSTER SCRAP
806 806 804 804 807 807
805 805 805 805
BOLSTER COVER, WEB & REINFORCING'S TO BE CONNECTED BY WELDING
BOLSTER ARRANGEMENT & DETAILS

# 8 WAREHOUSES THAT *Rush* AS ONE!

"Urgent phone call received on holiday —goods shipped that same day."

"Plates had to be cut to size—ordered 4:35 P.M.—shipped that night."




"Carload of beams for R. R. Bridge ordered 2 P.M.—shipped at 4 P.M."

"Emergency for flood work— —shipped in 3½ hours."

"Order received at 4 P.M.— shipped at 6 P.M."

"Order received Sunday— "shipped same day."

"Must receive tomorrow morning." (They did)

"Delivered in 6 Hours."

USS Scully Service

IT'S the same story with each of the eight Scully warehouses. They all operate on the principle that our customers always want their material shipped at once. Regular orders, special orders, rush orders—they all get Scully Service. (Of course, when you say "rush" we know you want extra prompt attention—and we act accordingly.)

Thousands of users know that when they want steel, steel products, copper and brass it pays to call Scully. They like the prompt, friendly Scully Service that they receive on every order whether for 10 pounds of steel or 10 tons.

Phone, write or wire the Scully warehouse nearest you. Each carries large stocks ready for immediate shipment. And ask for our complete Stock List and Reference Book. It's free, of course.

## SCULLY STEEL PRODUCTS COMPANY

*Distributors of Steel, Steel Products, Copper and Brass*
*Warehouses at*
CHICAGO · NEWARK, N. J. · ST. LOUIS · BOSTON · ST. PAUL-MINNEAPOLIS
CLEVELAND · PITTSBURGH · BALTIMORE

**UNITED STATES STEEL**

# Machine Tool Men Think Ahead In Modernizing Their Plants

(*Continued from Page* 25)

for our machine tools built in shops which are specially adapted to making such parts.

"We get work done by several Detroit shops and several Philadelphia shops and hope to get these shops familiar with the manufacturing of the parts we buy from them so when the parts are delivered to us they can be assembled in the Planetary without any work done on them by ourselves. We ourselves are making the parts more difficult to manufacture."

"While we are very busy at the present time," reports the Heald Machine Co., Worcester, Mass., "we are not going forward with any extended expansion. We are putting on an addition to the factory of about 30,000 square feet, which was brought about not so much due to the orders we are getting, but the fact that the machines that are being ordered are of larger size than we normally build. In other words, the orders that have been coming in the last year or so have been for large machines for doing large work.

**More Floor Space Needed Now**

"This necessitates a great deal more floor space, especially on the scraping floor. In scraping the table to the base on one of our regular, standard style machines, it would probably take around 100 to 140 square feet. The average of machines going through today would probably take at least double that, if not treble. Under these conditions, while normally we might not be shipping any more machines than in the past, it does take a lot more floor space to manufacture and assemble the same. Therefore, it was decided back early in the spring to put on an addition but we have just got around to doing it.

"Of course, the fact that orders have been increasing probably was instrumental in putting on this extra space, but the management has in mind, as we believe every machine builder has, the fact that some day we are not going to have all these orders, particularly from overseas, and then would come the problem of what to do with any additional space that may be added at the present time. As you know, or at least as we have found out, you cannot build up inventory without getting "burned" when business drops off and costs go down. Therefore, we are trying to carry our business on without any additional stock or surplus supplies and still satisfy the customers.

"In regard to the purchasing of new equipment, we have bought a few new tools. Two years ago we bought a lot of new equipment and therefore it is not necessary for us to put in new machines at this time to any great extent. We could use them no doubt, but the problem would be to get them under the present conditions with many deliveries six months to a year off."

Regarding its current program, Jones & Lamson Machine Co., Springfield, Vt., reports: "We have in the past twelve months built an addition to our pattern shop which approximately doubles its floor area. We have also built an addition to our plant proper which adds 24,000 square feet to our office and manufacturing area. For the past few years we have made rather heavy replacements and additions to our plant account. We do not have, at present, additional plant building in mind but will continue to materially add to, and replace, our machine tool and general plant equipment."

King Machine Tool Co., Cincinnati, is adhering to the following: "It has been our policy since the depression has lifted to equip our shop with new machinery equal in value to 10 per cent of our machine tool investment. Some of this equipment is to replace obsolete equipment; some is to meet the requirements of modern design in the details of our production.

"We are not disposed to build any additions to our plant, in spite of the fact that our orders recently have been very large in volume.

"We still have very painful recollections of the conditions we had to meet in 1932 and 1933 when the combined sales were not in excess of one-half month's business of today. Therefore, we are going to be quite cautious."

**Sensible But Not Sensational**

"Fortunately for us," reports Landis Machine Co. Inc., Waynesboro, Pa., "we have been in a position to carry through a continuous replacement program which eliminates any spectacular program since we have become so very busy.

"In practically all instances our continuous program of replacement of machine tools on account of quality brought forth an increase in productive capacity. Thus even with a very decided increase in business the increased productivity of our modern machine tools has not made it necessary for us to develop and put into effect an elaborate program.

"We have always felt that to keep abreast of the times we must continuously improve our products both in design and quality. An improvement in design brings forth a necessity for new equipment, while the improvement in quality doubles this necessity. Therefore, our policy has always been to follow a regularly developed program in replacement of old equipment and in the arrangement of new equipment, rather than to make splurges and spectacular improvements during period of prosperity."

**New Building a Coincidence**

Landis Tool Co., Waynesboro, Pa., makes this interesting comment: "Beyond running our present plant at full force, we have undertaken no expansions because of the present demand. It does happen that we have just completed a new building, 500 feet by 120 feet, this to be used exclusively as an assembly shop. However, even had the demand at this time been merely normal, we would have put up this new building because it was needed primarily for increased efficiency. It just happens fortunately that it will also increase our capacity to a cerain extent and we can of course put this to very good use under present conditions." (See STEEL, Dec. 11, 1939, p. 21.)

Michigan Tool Co., Detroit, sets forth its policy thus: "At the present time we are not enlarging our facilities for the manufacture of machine tools. So far, our facilities are quite adequate. We are, however, concentrating our manufacturing on our standard line of machines, and eliminating special types of equipment."

"In regard to the situation as it pertains to us," reports the Moline Tool Co., Moline, Ill., "would say we have installed some additional equipment during the past year, and in fact, we did so even during the depression, on account of work that we were able to secure which seemed to require greater productivity without increasing the labor costs.

"As regards enlarged or rebuilt buildings, we have not increased our floor area but we have of course done all that seemed advisable or necessary to keep our present plant in as high a state of efficiency as possible. As indicated, we have replaced some old equipment during the past two years, which of course makes a given floor space more effective than with the older types of machines. We are of the opinion that even with good business the machine tool industry should not be too anxious to increase the size of its plants. On the other hand members of this industry should always be

on the alert to replace its obsolete equipment with up-to-date and more efficient machines. This is what we have tried to do in our own business."

Morse Twist Drill & Machine Co., New Bedford, Mass., has this to say: "We are always buying new equipment and machinery to replace old or worn out items. During the past six months have bought or placed orders for considerably more than is our usual custom, but we have no definite expansion program in mind—only constantly keep up to date and improving our facilities."

National Broach & Machine Co., Detroit, covers its rather outstanding program in these few words: "We have recently added 45 per cent to our building and machinery, which will be devoted to new lines of work which you reviewed at our recent show. In this addition we will concentrate mostly on the RotoMilling and RotoShaving of round parts. The demand for this type of work is so great that we expect to be in full capacity by Feb. 1." (See STEEL, Oct. 30, 1939, p. 35.)

**More Machinery, Not Space**

"As far as our own program is concerned," writes the New Britain Machine Co., New Britain, Conn., we do not contemplate enlarging or putting up any new buildings. We are and have been doing a considerable amount of re-arrangement and we have made large additions to our equipment this year and last anticipating an increased demand for machinery. This program seems to be justified not only from an influx of foreign orders but the probability of a continuing increase in domestic demands.

"We will probably continue this program to some extent, although our purchases the last twelve months have actually anticipated additions to equipment that might have come next year and the year after."

"On the day we received your letter," reports the Oilgear Co., Milwaukee, "we let the contract for an addition to our factory buildings. This is to be a building 50 feet wide by 172 feet long with a crane runway the entire length of the building to accommodate a 5 ton traveling crane. The building is to be of brick and steel construction and will add 8600 square feet of floor space. It is badly needed in order that we may increase our assembly floor space to take care of the increase in business which we have experienced over the past year.

**Expansion Not Related to War**

"We are happy to say that this expansion has no relation whatever to the in Europe or the preparedness program of the United States, but is entirely because of normal growth of our horizontal and vertical broaching machine and hydraulic variable speed transmission business.

"There will be no machine tool equipment required for this addition as it will be used to relieve our assembly departments, which at present are overcrowded, and also to help us straighten the flow of materials through our entire plant.

"We feel that the condition which exists today and has existed for the past year is a healthy condition as far as we are concerned, because of the fact that our foreign business has been diminishing right along in percentage of the whole and because our business is spread through such a great diversification of industry. We expect this building to be ready for occupancy by the middle of January."

Rivett Lathe & Grinder Inc., Brighton, Mass., makes this statement: "Our expansion to meet the current demand on machine tools has not been in the form of additional buildings but more in rearranging our plant facilities, purchasing required new equipment and instituting a second shift. Our plant has always allowed ample space. In normal operating times there is always certain space which is not used and with the present requirements of business, we have expanded into these unused departments and do not require additional building expansion.

"Our new machines purchased and scheduled to be purchased have been occasioned by several factors; certain production units have become obsolete and have been replaced with lathes, shapers and milling machines. Other new machines have been and are being added because of the adoption of different machining methods, including broaching, thread milling and gear shaving.

"So far without disrupting the flow of our products, we have been able to keep our capacity in line with the much increased demand and will continue this process as far as necessary."

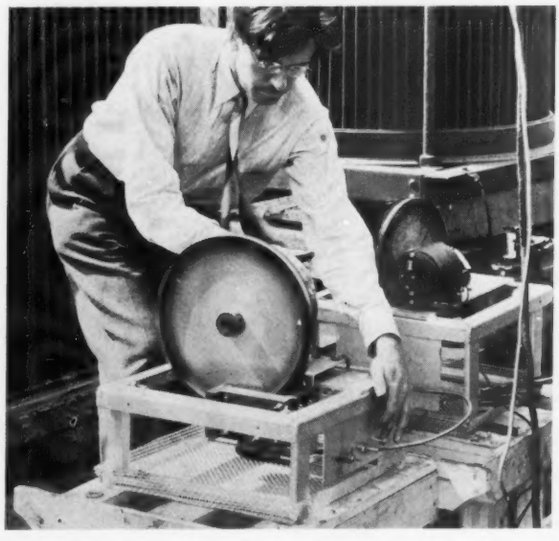
Rockford Machine Tool Co., Rockford, Ill., writes: "In addition to new equipment which we have added to our production lines, and which is now on order, we hope to have appropriations passed for an addition to our plant. This plan, if carried out, will add approximately 25 per cent to our present floor space. It is hoped that this addition may be started not later than early next spring."

**Heeds Law of Diminishing Returns**

Taft-Peirce Mfg. Co., Woonsocket, R. I., says: "Experience during the aftermath of the last war convinced us beyond peradventure that the law of diminishing returns is one which works very forcefully in the particular industry in which we are engaged. Indeed, it has been our whole policy of management to operate our plant and organization on a basis which would permit us to expand within the normal capacity of our business in good times, and at the same time be in a position to pull in our necks, so to speak, when depression conditions were the order of the day.

"If there is any one thing imbedded firmly in our brains, it is that the worst mistake which we could make would be to indulge in a program involving bricks and mortar at a time like this, and you may be very sure that the Taft-Peirce Mfg. Co. has no intention of making any such error.

"Of course with reference to the replacement of obsolete and obsolescent equipment, we have a firm policy of continual renewal of equipment here, through the annual expenditure of a sum equal to our



## Lightning Trap

■ This fulchronograph surge recorder was developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., to obtain records of the magnitude of current in a natural lightning stroke. It is being installed in substations, power lines and on high structures

depreciation reserves plus, in good years, a substantial appropriation from earnings.

"Currently we are buying machine tools heavily and expect to do the same thing in 1940. Indeed, in view of present machine tool deliveries, we have already committed ourselves for a portion of our 1940 program in addition to having expended the entire appropriation which we contemplated for 1939 plus a considerable over-run."

"We are, at the present time," reports Tomkins-Johnson Co., Jackson, Mich., "in the state of moving into a very recently completed addition to our factory space. This is an entirely separate building which is to include the heat treating plant, all grinders and our complete die-sinking milling cutter manufacturing department.

"The equipment for the heat treating is almost entirely new. The placing of our cutter department in this new building makes way for a better arrangement in the original main building. This had been practically impossible before due to a painful lack of space.

"New equipment which has been more recently installed in the original building includes several turret lathes, in addition to a considerable number of minor installations and added accessory equipment. We might also add that the newest types of lighting and heating facilities are being installed in the new building."

**Foresight Now Pays Returns**

Union Mfg. Co., New Britain, Conn., has completed a program along the following lines: "We added considerably to our machine tool equipment during 1937 and 1938 and, therefore, have not been making many changes during 1939, nor do we need to go further in the immediate future.

"In the foundry we completed, at the end of last year, an extensive sand and mold conveyor system, so that we have had little to do there.

"About the only building construction work this year has been work in connection with construction of new foundry wash room. We have, we might add, installed quite a number of electric motors in connection with equipment which was previously belt driven from line shaft."

Warner & Swasey Co., Cleveland, announces this very substantial achievement: "There has already been publicized the very sudden program which we carried through here in an emergency expenditure of $200,000 for machine tool additions. This is over and above a normal machine tool appropriation against which we work regularly. Then, of course, an expenditure such as this is followed by a substantial program of minor equipment purchases to supplement these additional machine tools.

"We have thus far fought off the idea of any actual property expansion, feeling that we are at the top of one of the types of sudden surges in the machine tool industry which are inevitably followed by a corresponding low level and we certainly do not want to be caught with an overexpansion as a consequence of the present situation.

**Making Most of Existing Space**

"We have done a good deal of studying of floor space possibilities and have re-arranged several departments in an effort to supply some small additional working space. One of our problems here has always been the matter of storage of the castings which have been delivered upon completion, from our foundry about 50 miles away. One of the ideas which has been developed resulted in adding floor space at the foundry so that finished castings can be stored and ordered into the plant on a daily basis according to a schedule now in process of being worked out."

In a review of this nature, it is common practice for the editors to close by summing up the general situation as revealed by the average of the reports. In this case it happens that one of the individual reports is itself a masterly job of setting forth a "platform for the machine tool industry" as far as its policy for meeting today's emergency and tomorrow's uncertainty are concerned. We refer to the report made by Howard W. Dunbar, vice president, Norton Company, Worcester, Mass. With Mr. Dunbar's permission, we now present his report in full:

"Like others in the machine tool industry we face the problem of a rising production curve. In our own case the limitation of this line will be a shortage of men, material, equipment or space, or a combination of two or more of these elements. We can summarize what we are doing towards increasing our capacity as follows:

1. *Men*

"We have made every effort to hire good mechanics who are available in our community, with the result that we are working three shifts in most of our departments. We have lengthened the hours for those who are considered regular employes. Even with this increase we recognize a limitation and, therefore, we have undertaken to create mechanics, first by increasing our apprenticeship work, and secondly, by hiring some likely looking prospects and classifying them as Learners. From this latter group we hope to have some men capable of operating machines in a comparatively short time. Lastly, we have transferred men from one job to another in cases where their training and ability can be used to better advantage.

2. *Material*

"We do not own our own foundry and therefore we are entirely dependent on other industries for our raw materials. It has not been our policy to lay in any great amount of stock but rather to anticipate our needs of castings, steel and purchased parts as measured by orders which are actually on our books.

3. *Equipment*

"We have purchased some new equipment. In most cases this could be classified as a replacement program since most of the equipment fills in spaces which have been vacant since we had our last housecleaning of obsolete machine tools. It is not our policy to add equipment where it means the creation of a new department.

4 *Buildings*

"We do not contemplate any expansion program. Our needs will be met with our present building facilities. To be sure we have rearranged so that we can utilize all available space. For example, we have condensed our storage room and we have thrown away an accumulation of worn out equipment and obsolete parts to provide more room for actual manufacture.

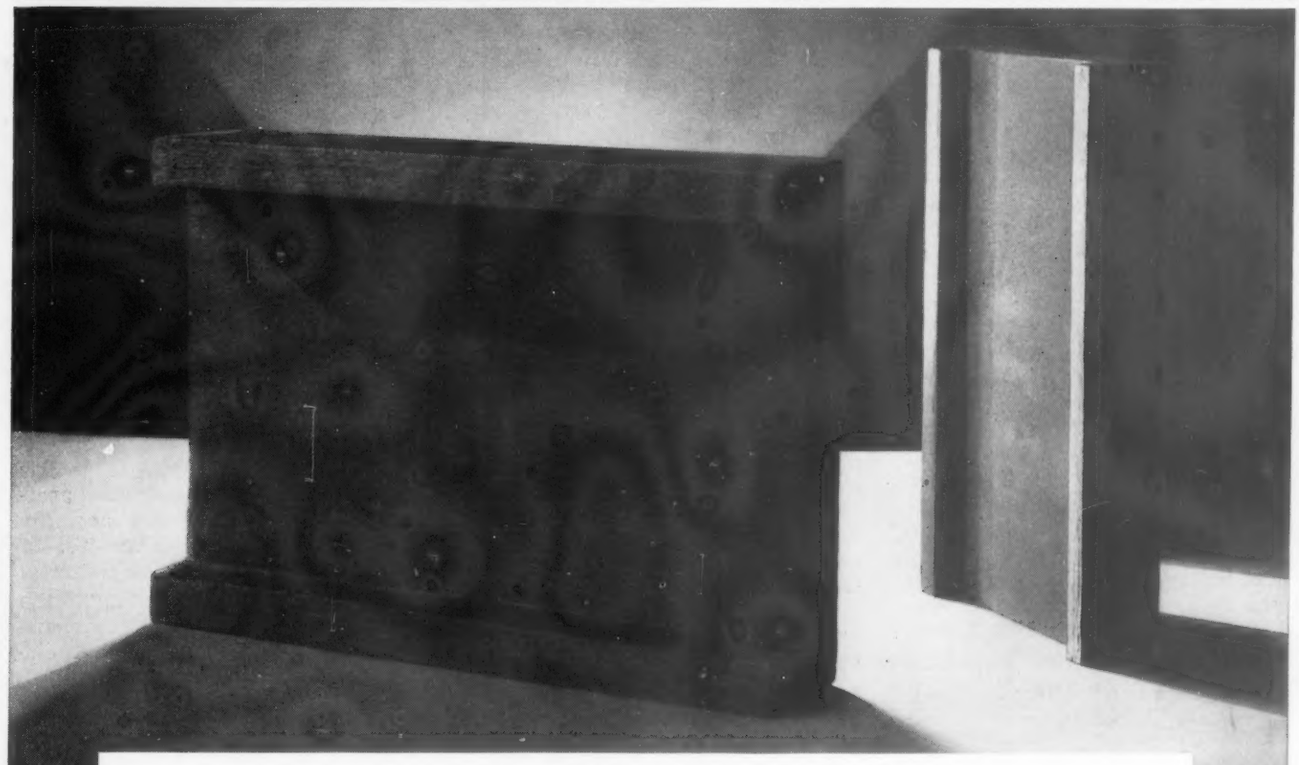
"To summarize then, we have not expanded and do not plan a program calling for new building or equipment, but we are meeting the high peak of production by more efficient utilization of our present equipment."

## Suggests Welding Auto License Plates to Frame

■ According to the *Wyoming Valley Motorist*, organ of the Wyoming Valley, Motor club of Wilkes-Barre, Pa., there would be a decrease in the number of stolen cars if license plates were securely welded to brackets and frame. This opinion is based on an interview with a convict in a Midwestern penitentiary who admitted he had stolen hundreds of cars.

Urging that plates be welded to their brackets and brackets to the supporting member, the convict said a robber wouldn't try to steal a car if the license plates could not be removed readily, although he would take a chance on the locking system of the car no matter how complicated. The interviewer took him seriously and found that the work can be done for about two dollars a year, which he regards as cheap protection from theft.

# Current Production Step-Up calls for "CARBOFRAX" HEARTHS



FOR years "Carbofrax" hearths have been famous for the way they speed up furnace operations and reduce costs. But now, with the current step-up in production, the advantages resulting from their high heat transfer are more important than ever. Every day more heat treating furnace operators are turning to "Carbofrax" hearths for

1. *Faster furnace operation—quicker "come-back"*
2. *Greater production from each furnace*
3. *Lower fuel cost per pound of metal heated*
4. *More uniform quality of work {bottom of work is heated at same rate as top}*

But that's not all! "Carbofrax" gives you these advantages, yes, and it *keeps on* giving them to you because of its long trouble-free life. If you want to step-up production and turn out better work at lower costs . . . if you want assured freedom from furnace interruptions and delays . . . be sure to insist on "Carbofrax" Hearths and Supports in new furnaces and for all replacements.

REFRACTORY PRODUCTS CARBORUNDUM

**THE CARBORUNDUM COMPANY, REFRACTORY DIVISION, PERTH AMBOY, N. J.**

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District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Agents: McConnell Sales and Engineering Corp., Birmingham, Ala.; Christy Fire Brick Company, St. Louis; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Co., Los Angeles, San Francisco, Seattle; Denver Fireclay Co., El Paso, Texas; Refractory Products Co., Chicago-Detroit.

(Carborundum and Carbofrax are registered trade-marks of The Carborundum Company)

# Railroad Car Weight Is Reduced By Use of High-Strength Steels

■ MANY papers of interest to the iron, steel and metalworking industry were presented at concluding sessions of the sixtieth annual meeting of the American Society of Mechanical Engineers in Philadelphia, Dec. 4-8. Among subjects covered in these papers were railroads, materials handling, industrial instruments and regulators, lubrication, piping, mechanical springs, administrative organization, machine design, industrial marketing, and education and training. Highlights of these papers are presented on the accompanying pages; earlier proceedings of the meeting were reviewed in last week's issue of STEEL.

### Deadweight Lowered

Battle of American railroads against deadweight in car construction continues, asserted E. G. Young, University of Illinois, Urbana, Ill. This battle continues not only in the field of passenger-service cars, he said, where car and train weights have been proved susceptible of 25 per cent reduction without sacrifice of strength, but also in the freight car field, where weights are being progressively scaled down for the dual purpose of reducing train weight and increasing pay load.

In passenger car construction, it was pointed out, savings of as much as 40 per cent in weight have been effected through use of low-alloy, high-tensile steels. There also has been a strong tendency toward use of 18-8 stainless steels in construction of cars for both steam and diesel-electric service.

Research into the economics of light-weight freight cars operated at higher speeds also is proceeding. Two 50-ton all-welded cars show weight savings of about 8000 pounds below the Association of American Railways standard. One of these weighs 37,500 pounds and has a load limit of 131,500 pounds, the second 36,800 pounds with a limit of 132,000 pounds. Twelve designs of freight car trucks for high-speed service now are undergoing service tests on the Pennsylvania railroad.

Several significant developments also are noted in railroad motive power. A new steam locomotive built in the Pennsylvania railroad's shops in collaboration with three large builders is designed to handle trains of 1200 tons maximum at speeds up to 100 miles per hour. Much also may be heard from a turbo-electric locomotive, developed after several years' pioneering and experimenting. Diesel-electric locomotives of 2000 horsepower have been developed and all previous maxima in terms of power have been exceeded in a single-unit Swiss locomotive of 12,000 horsepower.

D. S. Ellis, chief mechanical officer, Chesapeake & Ohio railroad, Baltimore, said that competition which has developed through other sources of transportation has stimulated experimenting by railroads in all directions, promising improvements in operations, in terminal facilities, and in the vehicles of traffic, both passenger and freight. Mr. Ellis said there is general acceptance of the view that long distance and mass transportation must still depend upon the railroads.

Important developments which have produced a new era in car design include new and improved construction materials such as the low-alloy, high-tensile steels, stainless steels and aluminum alloys. However, Mr. Ellis concluded that lack of background of experience from which probable cost of maintenance can be estimated, makes it appear likely that freight cars ordered in large number are likely to represent a compromise between extreme light-weight construction and heavy construction employed in recent years.

### Continuous Weighing

At the materials handling session, James A. Flint, Jeffery Mfg. Co., Columbus, O., described the theory and operation of continuous weighing. There is an increasing demand in these days of controlled operation, he said, to be able to continuously and accurately feed one or more materials by weight, either one at a time, or in groups, to produce continuously controlled mixtures, at either constant or varied rates.

As an example, he cited the new ore treatment plant now under construction for the Tennessee Coal, Iron & Railroad Co. at Birmingham, Ala., where eight weighing machines will continuously blend ore from 32 storage silos at rates up to 4000 tons per hour.

A high-frequency electric vibrating feeder forms the center about which the machine operates. The high-frequency vibration is of small amplitude, usually less than 1/32-inch, applied to the feeder deck at an angle so that it rises slightly on the forward stroke in the direction in which the material is being conveyed, and falls on the reverse stroke. In slow motion, the material would appear to be conveyed by a forward ratcheting action of the deck, with respect to the material on it.

The amount of material discharged by the feeder is controlled by the amplitude of the vibration which depends upon the amount of current applied by the stator. Current is controlled by connecting the feeder to a scale of the continuous-belt type. Whenever the scale is slightly out of balance, the current flow to the feeder is adjusted accordingly. Amount of material delivered from the scale is based on uniform weight of material on each inch or foot of the belt, multiplied by the number of inches or feet the belt travels in a unit of time.

### Automatic Control Discussed

C. E. Mason and G. A. Philbrick, Foxboro Co., Foxboro, Mass., prepared a joint paper on "Automatic Control in the Presence of Process Lags", for presentation at the session on industrial instruments and regulators. This paper did not attempt to set forth applications for automatic control of industrial processes but mathematical machinery by which operation of control of such processes may be investigated.

It was observed that although the alleged purpose of an automatic-control installation is that of holding constant certain process variables, this is in reality only accomplished by a series of recoveries from threatening balances, the continuity of which constitutes the record of control. In practice, the disturbances are normally gradual to some degree. It is this fact which makes possible the apparent elimination of the effects of upsetting influences.

"Thermostatic Bimetals" were discussed in another paper prepared by S. G. Eskin, Robertshaw Thermostat Co., Pittsburgh, and J. R. Fritze, Edison General Electric Appliance Co., Chicago. Use of these metals has increased rapidly during the last 15 years due to increase in automatic methods of control. A thermostatic bimetal is essentially two metals with widely different coefficients of expansion firmly bonded at their face of contact. When subjected to a change in temperature, the composite material will change shape, which change is utilized for control purposes.

Manufacture and application of plastic bearings were discussed by L. M. Tichvinsky, Westinghouse Electric & Mfg. Co., East Pitts-

burgh, Pa. Such bearings are made by molding at high temperature and pressure sheets of woven textile fabric which have been treated with an organic binder. In the case of Micarta, several layers of cloth previously soaked in a synthetic resin of phenol and formaldehyde are pressed together. Molding is done in hydraulic presses at pressures from 1200 to 2200 pounds per square inch and temperatures varying from 250 to 360 degrees Fahr. Resultant bearings do not require oil or grease but perform efficiently when lubricated only with water, which serves both as a lubricant and a cooling agent.

By virtue of good physical properties these bearings find wide application, he said. As guide bearings their performance ranges from small, high-speed spindles to large ship propeller shafts. Heavy-duty plastic bearings are used in the steel industry.

### Lubricant Behavior

Sydney J. Needs, Kingsbury Machine Works Inc., Philadelphia, described attempts made to detect the influence of boundary surfaces on the viscosity of thin films of lubricant between two optically plane parallel disks. The manner in which a liquid in contact with a solid surface is influenced by that surface has been the subject of considerable study in this country and abroad. It appears obvious, he said, that molecules of the liquid actually in contact with and adhering to the surface of the surface, must necessarily behave differently than adjacent molecules of the liquid in bulk. Minimum oil film thickness is not greatly changed by loads up to 800 pounds per square inch of surface area.

New processes in the power, oil refining and chemical during the past decade have resulted in a trend toward large-scale units and high operating temperatures and pressures, it was pointed out in a paper by D. B. Rossheim and A. R. C. Markl, M. W. Kellogg Co., New York, at a session on piping design. Today, most piping for severe service is carefully analyzed for forces and stresses. The authors said it was their practice to limit total stresses in pipe lines to 1.5 times the allowable code stresses, one-third of which is absorbed by longitudinal pressure stress.

### Helical Spring Technique

At a division meeting on mechanical springs, C. T. Edgerton, Crucible Steel Co. of America, New York, reported on fatigue tests of helical compression springs at Wright Field, Dayton, O. While results were somewhat scanty based on time and effort spent, Mr. Edgerton said a technique had been worked out which gives highly satisfactory results. Work at Wright Field has been discontinued but other arrangements are being made. H. C. Keysor, American Steel Foundries, Chicago, presented a paper on "Calculation of the Elastic Curve of a Helical Compressor Spring" covering a mathematical analysis in which the deflection at any point along the bar is obtained, permitting drawing elastic curve.

"Administrative Organization in Business and Industry," was the subject of a discussion by L. A. Appley, Socony Vacuum Oil Co., New York, at a session on administrative organization. He outlined a simple formula for relations of those in a supervisory capacity with other members of an organization. He said first the organization itself should be clarified, listing major activities. And, if several persons are identified with one activity, their relationships should be clarified. Second, standards of performance should be set up so that it will be known what is considered a good job. Third, proper individual analyses should be made. Fourth, help and information should be studied so that the individual can be aided in improving his performance. A definite time schedule for performance of activities also is important, he pointed out in his closing remarks.

A. S. Flemming, United States civil service commissioner, Washington, said that the process of locating authority is necessary in any group and that failure to do so results in confusion and disintegration. Defining of objectives also is necessary and, if this is done, the group probably will proceed toward them by the shortest route that is possible.

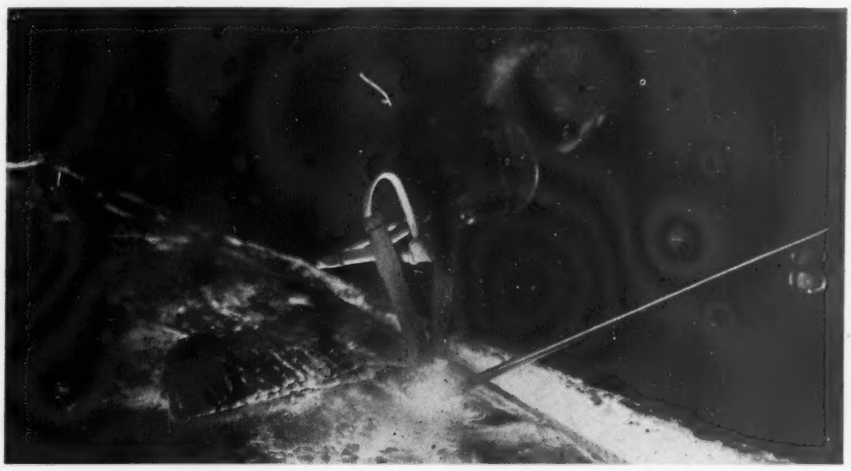
Process of developing an organizational structure also is important, Mr. Flemming said. Constant changes must be made in light of changing conditions and personalities. Equally important, is the process of devising methods of procedure for achieving objectives, he said, along with the process of determining ways and means of maintaining contacts.

### Specifying Instruments

In a paper, "Design Factors Controlling the Dynamic Performance of Instruments," C. S. Draper, professor of aeronautical engineering, Massachusetts Institute of Technology, Cambridge, Mass., and G. P. Bentley, consulting engineer, Waltham Watch Co., Waltham, Mass., suggested "a method of specifying the essential features of an instrument in terms of characteristics, which can be conveniently applied either for design purposes or for determining the suitability of an instrument for use in a given situation."

They presented a generalized treatment of instruments which have a single movable index, controlled by the magnitude of a single actuating quantity, and brought out that such an instrument from the standpoint of static indications, has essential properties, which can be specified in terms of range, scale sensitivity, calibration error, environment error,

## Hard-Surfacing Ship Propeller With Alloy Filler Rod



■ **To overcome effects of cavitation and erosion encountered in heavy-duty salt water service, this propeller blade of the ship "Lord Kelvin" is being hard-faced with cobalt-chromium-tungsten alloy filler rod. The "Lord Kelvin" draws an oceanic cable-laying plow used by Western Union Telegraph Co. Photo courtesy Haynes Stellite Co., 30 East Forty-second street, New York**

and uncertainty. They discussed the definition and use of each of these qualities.

Consideration of the effects of spring stiffness, acceleration, damping, and mass of the spring-mounted element on the maximum amplitude of vibration attained during acceleration was given by J. G. Baker, vice president, Baker Mfg. Co., Evansville, Wis., and consulting engineer, Westinghouse Electric & Mfg. Co. and Hamilton Standard Propellers, in a paper on "Mathematical-Machine Determination of the Vibration of Accelerated Unbalanced Rotor." Consideration was given primarily to see to what extent the maximum amplitude could be reduced by the proper choice of the magnitudes of these factors.

For an unbalanced rotor, amplitudes of vibration were given by the author for three different rates of constant angular acceleration and deceleration, with a brief description of the manner in which these results were obtained. In connection with these results, Mr. Baker then discussed the selection of spring constant, damping and mass of suspended unit as a means of avoiding serious vibration in bringing a heavily unbalanced spring-mounted rotor up to speed.

### Electrical Micrometer

A simple electrical micrometer of great mechanical and electrical stability has been developed, according to Ross Gunn, technical advisor and superintendent, mechanics and electricity division, United States naval research laboratory, Washington. The electrical current output from the micrometer, he said, is accurately proportional to the impressed mechanical displacement. The least count of typical micrometers using portable micro-ammeters as indicators and employing no amplification is 5/1,000,000 inch. Zero drift, hysteresis, temperature and pressure variations have been reduced to less than 1 per cent.

Mr. Gunn described special circuits which permit the indication of the sums, differences, ratios, or products of mechanical displacements, and which, therefore, are useful in many mechanical measurements. He said the micrometer is also convenient for zero and low-frequency vibration studies.

A method of experimentally ascertaining the actual stress-time curve in a mechanical part subjected to impact blow was described by R. Fanning, research assistant Massachusetts Institute of Technology, Cambridge, Mass., and W. V. Bassett, engineer, Bethlehem Shipbuilding Corp., Quincy, Mass. The apparatus used consisted of a resistance strain gage in conjunction with a high-speed recording oscillograph, the combination being sufficiently rapid in response to record strain variations occurring within a few microseconds, it was said.

The session on industrial marketing brought forth numerous pertinent suggestions, but none came in for greater emphasis than the need for a closer and more cordial relationship between the engineer and the salesman to the end that the product that they may be jointly interested in can be more effectively promoted. This was stressed by scheduled speakers and discussers alike, as a prime essential in effective industrial marketing.

### Engineering And Economics

Declaring that improved business conditions have opened up a need for evaluating the part of mechanical engineering in the general economic trend, John R. Bangs Jr., professor of administrative engineering, Cornell university, Ithaca, N. Y., mentioned co-operation between sales and engineering departments as one of several important factors which must be considered today by engineers in their work. Modernization of designs, mechanical improvements, production schedules and labor relations were other factors specifically referred to, and elaborated upon.

Frederick B. Heitkamp, vice president, American Type Founders Sales Corp., Elizabeth, N. J., placed importance of harmony of action between the engineering and sales departments at the top of his list, and urged fuller familiarity on the part of both groups with the field performance of their products, and a frank recognition of their faults or failures, so that better equipment could be developed. Alertness in conceiving a better and more competitive product was also listed high among the requisites by this speaker.

Use of market research in introducing new industrial products was discussed by Robert Gibson, General Electric Co., Schenectady, N. Y., who pointed out that this research has been successfully employed by the radio, electrical and automotive industries. He outlined various methods of gathering facts and figures about public reaction and acceptance, and listed some products introduced in recent years.

Sharply increased activity in the metalworking field in recent months has revealed a distinct shortage of skilled mechanics. Hence the presentation of three papers on the subject of education and training of apprentices came in for special attention. Lt. Col. Victor W. Page, United States air corps reserve, consulting engineer, Middleboro, Mass., outlined a complete program of training, based on his extensive experience in both the automotive and aeronautical industries. During recent months the aeronautical industry has expanded particularly rapidly and its expansion would have been still faster, he said, if it had not been for a lack of skilled workers.

The apprenticeship program of the General Electric Co., Schenectady, N. Y., was described in detail by Ray E. Ellis, supervisor of apprentices, who said that since the program was inaugurated 5171 young men have been graduated from various courses in nine plants. He concluded there was no better or economical way of meeting the need for highly-trained men than through apprenticeship training work.

Tracing developments which have led up to the present shortage of skilled mechanics, Elmer H. Neff, Brown & Sharpe Mfg. Co., New York, said that, under present disturbed world conditions, more intensive training of apprentices was not only of vital importance to industry, but to the nation. He described the system of training which has been developed by his company in Providence, R. I., over a period of almost 100 years.

### Oil Film Investigated

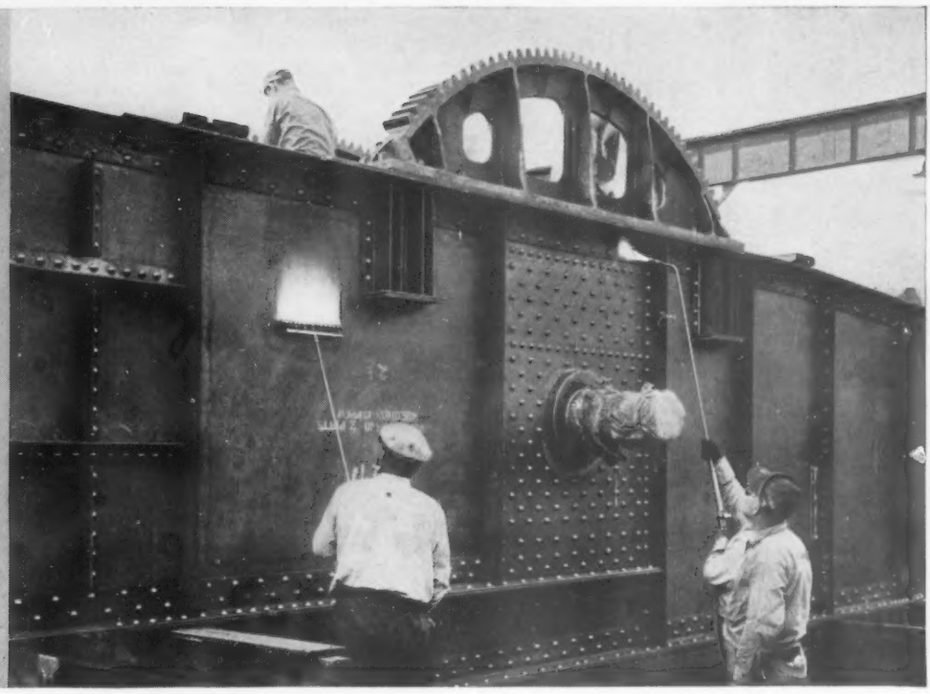
An investigation to determine the effect of removal of the bearing-metal surface and the pressure at which the oil film breaks down as a result of variations in the crystalline structure of the bearing metal was described by John R. Connelly, associate professor of industrial engineering, Lehigh university, Bethlehem, Pa., in a paper, "Influence of Crystal Size on the Wear Properties of a High Lead Bearing Metal." For the bearing metal tested, the conclusions were that (a) crystalline structure is a factor and crystal size an important variable in thin-film lubrication, (b) rate of wear and equilibrium pressure are related, and (c) pressures at beginning and end of lubricated wear are related.

It also was concluded that the method of investigation used provides a way of determining quantitative values of rate of wear, equilibrium pressure, and the pressure at the borderline condition between unlubricated and lubricated wear.

E. S. Pearce, president, Railway Service & Supply Corp., Indianapolis, presented results of an investigation on heat distribution in a conventional journal box assembly, outlining the test procedure followed. He concluded that the control of heat sources is the first step in avoiding limiting effects of temperature rise in the assembly, and that the condition of waste, the oil used and the bearing are the basic factors in controlling these sources of heat.

AIRCO

# FLAME CLEANING

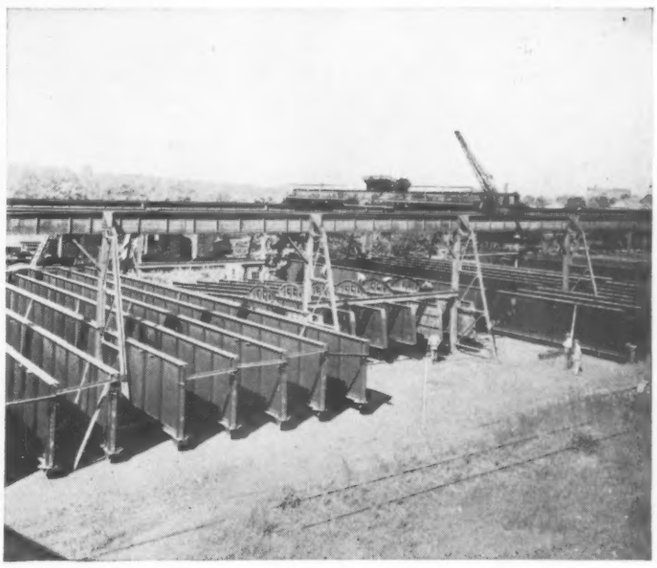


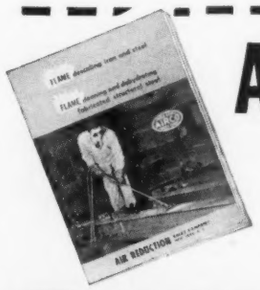
# Forestalls Future Paint Flaking

The gradual loosening of scale, due to the presence of moisture, is one of the principal causes of paint flaking from structural steel. Airco engineers have effectively solved this problem by the application of an Airco high-temperature oxy-acetylene torch to the fabricated steel just prior to painting.

By quickly passing the torch over the surface, the occluded moisture is driven from within and beneath the surface, leaving a warmed surface that has proved extremely beneficial in obtaining a lasting paint job. The illustration above shows one of the girders of a 4,000 ton bridge being Airco Flame Cleaned with a 14" flat tip on flat surfaces, and a style 110 No. 1 round tip on rivet heads and corner connections.

Airco engineers will be glad to lend their experienced advice to help you solve any problem involving the oxy-acetylene process. Consult us.





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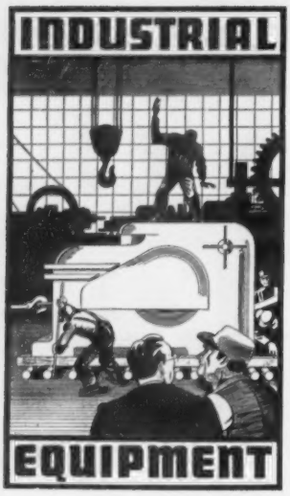
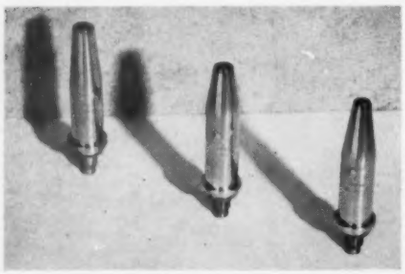



## Cutting Nozzle

■ The Linde Air Products Co., 30 East Forty-second street, New York, offers Oxweld precision cutting nozzles which make cuts of such quality that it is claimed that no subsequent machining is required. The cutting oxygen passage is highly polished, thus producing a smooth gas flow without deflection or turbulence which results in clean, smooth face of cut.

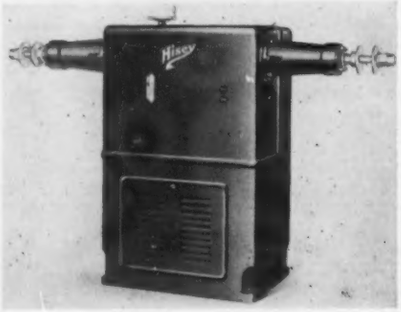
Preheat holes are smaller and



spread over a larger circle so that heat is less concentrated on the line of cut, resulting in a squarer, cleaner, sharper upper edge. The cutting oxygen passage is exactly vertical when the blowpipe is vertical. In cutting shapes or circles, face of cut is true all around.

## Polishing Machine

■ Hisey-Wolf Machine Co., Colerain and Marshall avenues, Cincinnati, offers its improved polishing machine with speed infinitely variable between 1000 and 3500 revolutions per minute. Speed is changed while spindle is in action and under a




working load. To change speeds from extreme low to extreme high or vice versa requires 10 seconds. Machine is made in 3, 5 and 7½-horsepower capacities. Speed dial plate in front of machine is direct-reading, indicating revolutions per minute of spindle.

## Industrial Tractor

■ Model "IB" industrial tractor with 13.5 drawbar horsepower is announced by Allis-Chalmers Mfg. Co., 1126 South Seventieth street, Milwaukee. Low center of gravity enables this tractor to haul up and down inclined ramps without tipping. Foot brake, three forward speeds and reverse, muffler, foot

accelerator and comfortable seat are provided. Individual hand brakes on rear wheels facilitate maneuvering in cramped quarters.

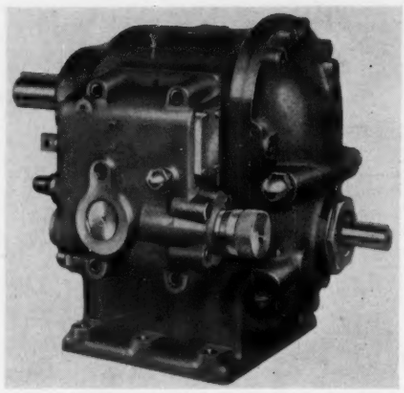
Structural steel frame surrounding engine and radiator can be provided so snowplows, brooms, compressors, highway mowers, etc., can be mounted. This frame also protects tractor and serves as a bumper for pushing jobs. Valve-in-head engine has removable cylinder liners, a foot controlled governor and is protected by oil, air and fuel filters. Fuel consumption is claimed to be less than one gallon per hour To hitch a load, the tractor is backed up until load trips automatic coupling.

## Variable-Speed Unit

■ A 2-horsepower oil-power variable speed transmission especially designed for machine tool applications is announced by Sundstrand Machine Tool Co., Rockford, Ill. It provides a speed range steplessly variable from 10 to 3000 revolutions per minute and is suitable for either speed or feed drives. Multiple piston pump is mounted below an oil-power fluid motor of the same type. Controls are said to be simple and extremely flexible.

Featured are a high overall efficiency with high starting torque at low speeds. There is no power loss in accelerating from standstill to maximum speed or in starting and stopping. No valves are used in reversing and there are no rotary valves. Pump and motor valves operate at only 1/20 the surface speed of rotary valves.

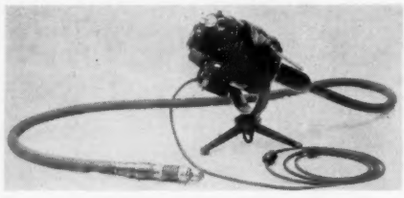
Transmission is in a small case



for building into machine tools, but is also suitable for wide range of industrial application as either mechanical, hydraulic or electrical controls can be provided.

## Cleans Transformer Tanks And Radiators

■ Cleaning of transformer tanks and radiator surfaces is aided by a new tool developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. A 110/220-volt, single-phase, 60-cycle, 3450-revolution-per-minute, ½-horsepower motor on a short stand drives a flexable, rubber-encased shaft 8 feet



long to the end of which can be attached any of several devices for sanding or grinding. With this tool doing work usually performed by hand brushes and scrapers, tank surfaces and hard-to-reach surfaces of radiator cooler fins can be cleaned of dirt, rust, scale, or loose paint preparatory to repainting. A variety of cleaning brushes and other fittings is available.

## Capacitor

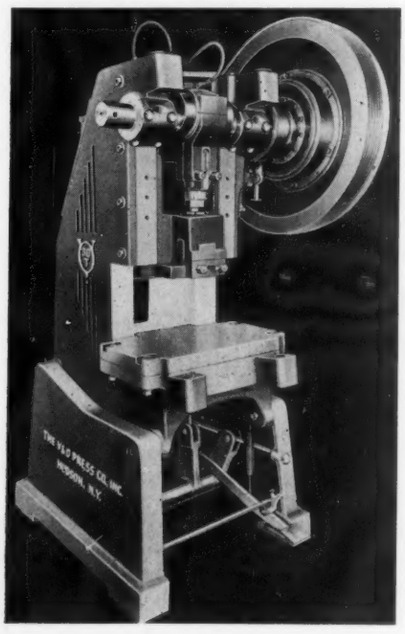
■For power-factor improvement in industrial plants, General Electric Co., Schenectady, N.Y., offers a group of new Pyranol capacitor equipments mounted either on platform or floor or suspended from ceiling. This new equipment, class DTSR, is of all-welded sheet steel, which makes it a strong, rigid rack of smooth, pleasing appearance. Bodies of the units are exposed to stream of ventilating air, but bushings, bus bars and fuses are enclosed in a dust-tight compartment, eliminating any possible difficulties from dust and dirt accumulation. Conduit knockouts are provided on top and both sides for ease in making connections.

There are no external discharge resistors in these new units as the resistors are built in. All fuse clips and fuse ferrules are silver-plated to eliminate oxidation. Switches may be mounted on pillars or walls when units are suspended from ceiling.

## Inclinable Press

■ V. & O. Press Co. Inc., Hudson, N. Y., announces an inclinable press with newly designed, ball actuated, self-energizing friction clutch affording an infinite number of engaging points, overload relief, smoother action, backing up feature and higher operating speeds resulting in greater production.

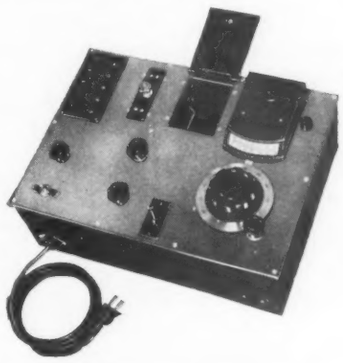
Directional panel is provided for centralized controls of built-in clutch lock, single stroke clutch (which is adjustable for continuous operation) and fully releasable or constant brake. Higher safety factor is provided for greater rigidity. Other features include more compact motor drive arrangement, more bed area, wider and heavier flanged slide, more slide adjustment, safer inclining machanism (operated from in front of the press), easier treadle action, one-shot lubrication, improved loop-type safety guard and ball-bearing mounted webtype flywheel.



## Colorimeter

■ Lumetron photoelectric colorimeter, allowing use of many sample holders and light filters including monochromatic filters, is announced by Dr. F. Loewenberg, 10 East Fortieth street, New York. Applications of this instrument are said to range from measurements of light transmission of liquids to colorimetric and turbidimetric chemical analysis and to abridged spectrophotometric determinations.

The colorimeter uses two blocking-layer photocells in a balanced circuit, so it can be operated from the power line without batteries or constant-voltage transformers. Line voltage changes have no effect upon readings obtained. Model K1-401 for general colorimetric determinations and suited for sample holders up to 1 inch is self-contained with built-in pointer type galvanometer and sells for $195.



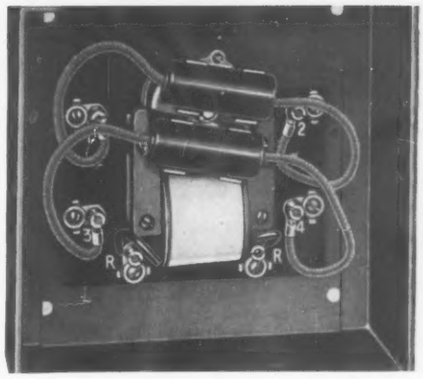
## Rotating-Type Relay

■ Autocall Co., Shelby, O., announces its M-39 rotating type relay employing a tilting mercury switch. Magnetic brake dampens the movement of the switch, making it "dead beat" in action.

The mercury switch, attached to a rotating disc on the armature shaft of the magnetic element, consists of an iron tube, insulated cap and refractory breaker. Breaker shields metal parts from the arc and retains a pool of mercury in the cap end of the switch so there is always a positive mercury-to-mercury contact. It also serves as a dam over which the mercury separates, thus definitely locating the arc, which is de-ionized and completely shielded .

Two styles are available—one with a single switch and the other with two. Switches are furnished for make or break, or for make-break combinations. At 115 volts alternating current, each switch has a breaking capacity of 15 amperes. Operating coils from 6 to 250 volts alternating current or direct current are available.

The entire mechanism is mounted in a metal cabinet 6 x 6 x 3 inches.



## Portable Lamp Guards

■ McGill Mfg. Co., Valparaiso, Ind., offers No. 3002 safety Vaporproof guard for 60-watt lamps and No. 2599 guard for bungholes and other places where space is limited. The No. 3002 handle is of mercerized bakelite equipped with bakelite packing nut and rubber packing gland which provides strain relief and makes guard waterproof. Cage is of brass wire with two brass rings for bracing and is grounded to the socket. Globe is of heat and impact resisting glass.

The No. 2599 is all steel, 35¾ inches long by 1 inch in diameter. It has cord protector, strain relief and hook. Steel cage has thirty-two ⅜-inch holes and four ¼-inch holes for the light. Finish is nickel plated.

## Steam Vapor Cleaner

■ Homestead Valve Mfg. Co., Coraopolis, Pa., offers two new Hypressure Jenny steam vapor spray clean-

ers, Model "J-R" (heavy duty) and Model "J-H" (extra heavy duty). Model "J-H" is furnished in both stationary and portable models with either simplex continuous vapor flow or fully automatic nozzle control.

Electric spark ignition gives instant starting, and pressures up to 150 pounds are reached within 1½ minutes. Machine has either one or two guns. Pressure atomizing fuel oil burner has nonclogging heating coils. Design is simplified and streamlined with all mechanism on end panel with quickly removable cover.

## Stamps Hot Metals

■ A new Markwell tandem holder to stamp very hot metals is announced by Pittsburgh Stencil & Tool Co., 747 Crafts building, Pittsburgh. This double-line axe-type holder with three pieces of type in each line, when swung like an axe is said to be much more likely to imprint all six numbers than one with six numbers all in one line.

The only moving part is a pin in each row of type which carries its own spring. One motion locks it, another unlocks it. Markwell holders employ special as well as ordinary type, and come in all sizes from 1/16-inch type up to 1-inch or larger.

## Truck Power Plant

■ A new line of Ready-Power units rated 36 to 48 or 60 volts for trucks of two to five tons capacity, built around the Ford model "B" 4-cylinder engine is announced by Ready-Power Co., 3826 Grand River avenue, Detroit. These model "FC" machines are a refinement of the "FCM" Ford engined units and include a new fan mounting which provides complete belt adjustment and improved cooling; front outlet exhaust with either up or down muffler position; oil bath breather; fully enclosed inductor-type magneto; "Syncotrol" automatic idling governor with 4-speed adjustable resistance; metered crankcase ventilation; oil bath air cleaner; low pressure removable cartridge-type oil filter and front end air cleaner. Self-starting feature is optional.

These units are interchangeable with Ready-Power "Standard" model HC units, housing and mounting tray being identical.

## Portable Pyrometer

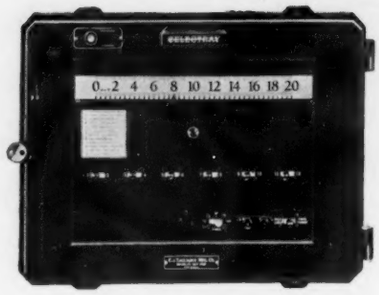
■ A portable lance-type pyrometer, Hold-Heet, said to indicate temperatures within 2 per cent is offered by Russell Electric Co., 343 West Huron street, Chicago. It is direct-reading and has manual cold end adjustment. No battery or electrical connections are necessary.

Thermocouples are of 6-gage wire (slightly larger than 3/16-inch) to withstand rough shop usage. Various types of thermocouples are available in lengths up to 6 feet so operator can stand away from heat when taking a reading. For checking temperature of tin, lead, solder, babbit, type metal, spelter and brass, a Type B holder with Type D open tips is recommended. Tips

are easily and inexpensively replaced. Welded tips are also necessary in checking liquids which are nonconductors. Pyrometer is $16 and thermocouples from $1 to $4 extra.

## Self-Balancing Indicator

■ A new Celectray self-balancing indicator, multiple point, is announced by C. J. Tagliabue Mfg. Co., Park and Nostrand avenues, Brooklyn, N. Y. The Hair-Line indicator crosses 10 inches of scale in 10 seconds and is for applications where a large number of temperatures are to be measured. The indicator will balance on successive points more rapidly than an operator can record them. An "in-balance" signal lights when the carriage travels from one point to the next, flickers when it




steps into balance, and stays out when it is time to take the reading.

Two other models are available, one having 22 seconds for the carriage to cross the scale, the other 45 seconds. The scale is lighted by a Lucite rod which carries the illumination from the same source of light that is used to determine the galvanometer position.

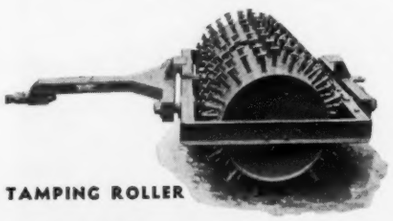
A switch box or combination of switch boxes of the same design as the instrument case, can be supplied for an unlimited number of points.

## Tamping Rollers, Rippers

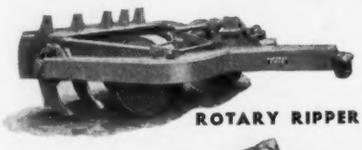
■ Bucyrus-Erie Co., South Milwaukee, Wis., has introduced new tamping rollers and rippers. Tamping rollers are offered in single, double or triple drum models with 72, 96 or 112 feet per drum available in each model. All rollers have rear pull connections for working in trains, and all drums are provided with openings for ballast. Double and triple drum models have oscillating drums which permit rollers to adapt themselves to uneven ground surfaces. Tamping feet are renewable.

Rotary type ripper is a rotating head which swings ripping standards up, back and around to ripping position again quickly. Speed of raising and lowering of standards is said to make this machine suitable for work in material containing boulders and heavy roots.

Heavy-duty, cable-operated rip-



TAMPING ROLLER



ROTARY RIPPER

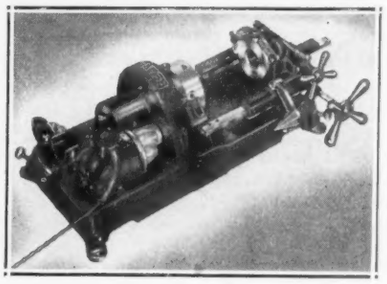
HEAVY DUTY RIPPER

per is for breaking up exceptionally hard-digging hard-loading materials such as shale, hardpan, decomposed granite, sandstone, old macadam, etc. Controlled by a cable operated from the tractor winch, standards on this ripper can penetrate full length below ground level, 17 inches on Model CR-1 and 24 inches on Model Cr-2.

## Pipe And Bolt Machine

■ Model-B pipe and bolt machine offered by Beaver Pipe Tools, Warren, O., cuts, threads and reams ⅛ to 2-inch pipe; threads bolts ¼ to 2-inch; cuts off bolt stock ¼ to ⅞-inch and cuts and threads 2½ to 8-inch pipe with driveshaft and geared tools.

Machine has quick-opening adjustable ring-type dieheads with no hinge



to collect chips and full range ⅛ to 2-inch cone reamer. Low center of gravity makes for stability.

Model-B is available with a gear-driven reversible Tuthill oil pump or with a 1-gallon overhead reservoir, which flow oil to threading dies by gravity, as well as without any provision for oiling.

## Magnet Crane

■ Harnischfeger Corp., 4200 West National avenue, Milwaukee, offers model 255 magnet crane with 39-inch circular magnet and 40-foot boom, having a capacity of more than 1½ tons. The crane itself (not the magnet) has a capacity of 5200 pounds and 25-foot operating radius, and as much as 9800 pounds capacity at a 15-foot radius. Equipped with a magnet cable reel and 85-foot tag line, crane is driven by a 35-horsepower P&H motor-generator set, which works under 220-volt, 3-phase, 50-cycle current.

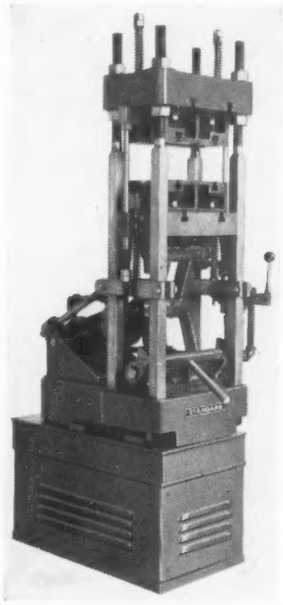
Tail cable bracket prevents cable

from catching on or under crawler track. Crane has a waterproof cable receptacle to facilitate working in wet weather. The three forward speeds range from ⅝ to 2½ miles per hour. Crane is easily maneuvered and has tractor-type crawlers. It is built of all-welded alloy steels.

## Plastics Molding Press

■ Standard Machinery Co., Providence, R. I., announces a new 20-ton "Standard" plastics molding press of the quick-acting toggle-type, to be marketed by F. J. Stokes Machine Co., Olney P. O., Philadelphia.

One press is self-contained, hydraulically operated, with motor and duplex pump in the base. The other is air-operated at 125 pounds pressure and is furnished without motor or pump, ready to connect to pressure supply. Both are suitable for experimental purposes as well as for all production work within their range. Opening speed of press is 80 inches and closing speed 75 inches per minute. Toggles not only open and close the press rapidly but

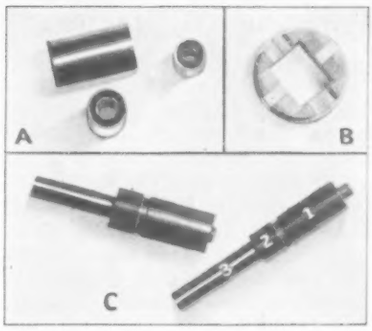


automatically slow mold down as it closes.

Automatic time-cycle control or finger-operated lever control are available.

## Kennametal Parts

■ McKenna Metals Co., Latrobe, Pa., announces that Kennametal is now available in almost any desired shape for use in parts subject to unusual wear or for gages which must hold their accuracy. Fig. A illustrates three sizes of extrusion dies for coating steel welding rods with abrasive flux. Fig. B is a die for pressing articles of refractory aluminous oxide. Fig. C shows progressive-type plug gages for measuring steel bores, such as ball bearing races. A cylindrical shell of



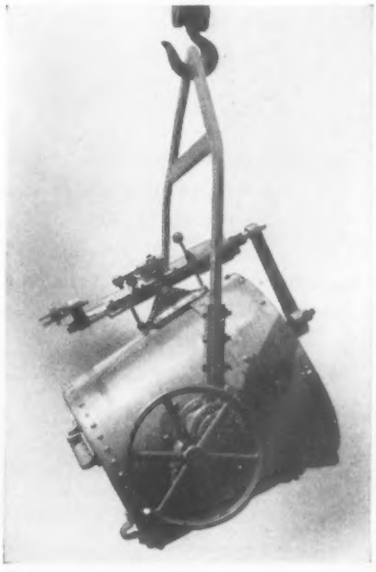

Kennametal (1 and 2) has been silver soldered to a steel handle (3). The Kennametal section "1" at right of relief groove has been accurately ground to 0.2495-inch diameter; and section "2" at left to 0.2500-inch diameter. In testing a bored hole, section "1" will slip in but section "2" will not, thus measuring size to within 0.0001-inch accuracy.

## Worm-Geared Ladles

■ A line of worm-geared ladles, ranging in capacities from 2 to 5 tons for handling molten steel and other metals, is introduced by Treadwell Construction Co., Midland, Pa. Construction features include a stopper rig for drawing pure, slag-free metal from bottom of ladle and a geared turning device preventing any movement of the ladle due to weight of molten metal.

Stopper rig, or harness, consists of a carrier arm, slide, guide, and stopper rod which extends down through the metal to bottom of ladle. Rod has a fire clay sleeve and graphite plug on bottom. When plug is raised, molten metal is discharged through bottom of ladle and slag, which floats on top, is prevented from getting into ingot mold or casting.

Self-locking turning mechanism consists of a worm wheel mounted on ladle trunnion and integral with the bail.



## Brine Quench Hastens Scale Removal

■ According to Dow Chemical Co., Midland, Mich., numerous manufacturers of high-carbon steel are quenching the heated metal in a calcium chloride brine. An 18 to 20 per cent solution of Dowflake calcium chloride kept at 80 degrees Fahr. used for this purpose is claimed to be superior to plain water since it removes the scale on steel quenched which was developed during the heating process and eliminates the possibility of soft spots. The hot steel, at about 1550 degrees Fahr., is quenched in this solution, then taken by conveyor to a cleaning bath where the calcium chloride solution is washed off in preparation for painting.

## New Manual Covers Cutting of Metals

■ *Manual on Cutting of Metals*, 300 pages; published by American Society of Mechanical Engineers, New York; supplied by STEEL, Cleveland, for $5.

This is a manual of shop-tested information on speeds and feeds that can be used with various depths of cut in machining all the common and alloy steels in ordinary use. It has been prepared for use in the shop and performances of 10 to 25 per cent better than usual have been attained.

Since the pioneering work of Frederick W. Taylor in 1908, while president of A.S.M.E., additional research has been carried on in the same and allied fields. These sources of information were studied by the society's committee on metal cutting, which prepared this manual. Gaps were filled in by experimental work. Important facts or laws relating to metal cutting were determined from the correlated experiments and published data and extensive tables were prepared.

Data are presented in a form to be used directly in the shop or by the mechanical engineer, production executive, machine designer or shop mechanic. Information on general relations makes it possible to calculate data on use of tool shapes, depths of cut, feeds and other factors not included in the tables.

## Rebuilding Stacks

(*Concluded from Page* 65)

coating 3 inches thick at the top and 9 inches thick at the bell. This unit also was reconstructed during August, 1939, by Cement Gun Co., Allentown, Pa.

In the first gunite coat or lining, the cement is Lumnite. This is a hydraulic cement of the calcium-aluminate type and is used for two reasons. First, it is resistant to the corrosive action of stack gases. Second, it is serviceable at high temperatures. Because of its heat-resistant property, Lumnite is used in making refractory concrete and high-temperature insulating concrete as in the construction of these stacks.

A variety of special aggregates is available for the insulating and corrosion-resistant mortar. At Gary, trap rock was used purely for corrosion resistance. At Aliquippa, greater insulation was obtained by using a light weight manufactured aggregate.

Portland cement and a good concrete sand are used for the gunite structural shell. An anchor frame of special design is fitted over anchor bolts of the original stack. A flange is placed at top of stack to cover the joint between steel shell and gunite.

This method of constructing a gunite stack around an old steel stack is covered by patents controlled by Cement Gun Co.

In all cases, the original stacks had been lined with brick, and these linings were left in place. Cost of rebuilding stacks as described above is considerably less than that of building a new stack. In fact, the cost of taking down the old stack alone is quite large. Thus, the new development may be of considerable economic importance in reconstructing or rebuilding old stacks.

•

# MATERIALS HANDLING

## Stamping Plant

(*Continued from Page* 56)

in a more distant part of the plant, removed from the press shop. Therefore, specially designed crates with removable hinged covers were built for conveying parts from the last stamping or forming operation to the pickling room. Here, each crate load conveyed on forks is transferred to metal pickling basket as shown in Fig. 4.

As production increased, storage requirements also rose, so a method of stacking more closely to the ceiling was developed. This is done using these same crates, originally designed with short legs at the bottom and flaring metal ears at the top corners. The short legs leave ample room for the forks of the truck to enter, while flaring metal ears on the upper corners make it easy for the operator to center one crate on top of another. Slight variances off-center in placing the load made no difference as the legs of the upper crate, as shown in Fig. 5, follow the curve of the metal ears into a dead-center position. Consequently, the operator can place his loads more rapidly and accurately.

Another important use for this same lift truck was found in the handling of heavy dies. It is used to take dies from the die rack to the presses. Upon completion of a run, it delivers the dies back to the die rack as shown in Fig. 6. In this work, the hydraulic lifting mechanism is of even greater significance, as it permits dies to be handled gently and placed with accuracy.

More efficient handling at this

The real test of a wire rope is on the job. There is where quality counts . . . there is when claims give way to facts . . . and there is where "HERCULES" (Red-Strand) Wire Rope has proved, and continues to prove, its exceptional value

*Furnished in both Round Strand and Flattened Strand constructions — in either Standard or Preformed Type.*

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plant has placed us in a better position to handle more business and handle it more efficiently whether it is straight stamping work or the finished product fully enameled. This is largely due to the fact that the trucks eliminate waste of press operator's time formerly required in arranging work to feed the press.

With the truck delivering sheets exactly in position to feed into the press and taking the completed work away as fast as it accumulates, each press operator is free now to spend all his time on productive work, actual press operation. The increased output thus possible for each man to attain, coupled with elimination of heavy handling operations, accounts for the enthusiasm with which the new handling system has been received.

♦

## Nickel Detergent

■ Chrome Resistex, developed by MacDermid Inc., Waterbury, Conn., is a detergent for preparing buffed nickel or bright nickel work and has the property of absorbing large amounts of chrome solution without rapid decomposition. It also has a special inhibitor that precipitates contamination of solution drag-in on racks or rack coating. This is said to maintain the original cleaning quality of the solution for a longer period.

## Passenger Coach

(*Continued from Page* 66)

of floor beams to support air-conditioning ice box and other equipment.

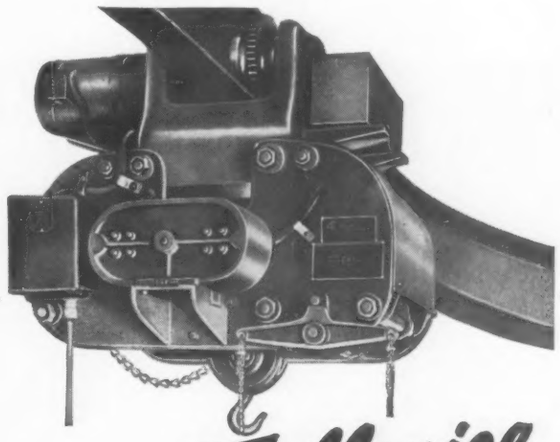
Underframe is assembled by setting center sill on the assembly jig along with other components held by temporary bolts. After being lined up, bolsters are welded to center sill by a series of vertical and overhead fillet welds. Platform castings are riveted and welded to center sill along lines of contact. Floor beams are attached to center sill by riveted clips and fillet welds.

With top floor beams applied, side sills are fastened to floor beams and bolsters by rivets and by butt joint welds at top of side sill to transverse members. End sills are fastened by rivets and a butt joint weld. Side sills have same camber as center sill. In fact, floor beams, bolster and side sills actually support weight of center sill, which carries no vertical weight but merely absorbs horizontally applied stresses. This is a departure from old practice where center sill carried not only its own weight but also about one-third of the car weight. The new construction permits a reduction in dead load.

Next, all tank supports and pipe clips are welded to underframe. About 22 pounds of ¼-inch electrode and 23 pounds of 3/16-inch rod are employed for this work which takes approximately 9 hours.

Superstructure is built of standard channels, I-beams, angles and special pressed steel shapes. Purlines are made of two channels joined back-to-back to form an I-beam. Due to side and roof construction, side posts and carlines assume qualities of an inner hoop on a tube, thus strengthening the assembly. Side posts and carlines are pressed channels made from ⅛-inch sheet. Posts are punched for plug welds to side sheets. Some difficulty encountered in making these plug welds was eliminated by changing the 5/16-inch round holes previously used to elliptical holes about ⅜ x ⅝-inch. To keep down buckling of the sheets, these welds are made on a stagger system. This keeps heat and expansion to a minimum. A paste of water and asbestos applied along line of welding acts as a cooling medium and assists in keeping heat to a minimum.

Angle stiffeners such as window header angles, etc., are made and

Motor Trolleyize
A-E-CO LO-HED
Class B Hoists at a moderate cost

If you already own a Class B, A-E-CO Lo-Hed hoist or are going to buy one, consider the advantages of adding the new low cost Type RB Motor Driven Trolley when:
1. The haul is long or often repeated. 2. The path under hoist is obstructed. 3. Speed is an important factor.
For high-lights of this new motor trolley see A-E-CO POINTS (below). For full details write for the RB folder today.

AE CO POINTS

- Separate unit attachable to any Lo-Hed Class B hoist.
- Short wheel base—turns any curve of 7' radius or over.
- Low headroom. • Four Wheel drive.
- Choice of 2 trolley speeds—100 & 150 F. P. M.
- Trolley balanced by adjustable counter-weights.
- Heavy duty ball bearing hoist service motor.
- Hyatt roller bearings.
- Cast steel trolley wheels with machined rolling surfaces. • Cast steel housing.
- Alemite fittings . . . Remember—

LO-HED COSTS LESS PER LIFT

OTHER A-E-CO PRODUCTS: Taylor Stokers, Marine Deck Auxiliaries, Hele-Shaw Fluid Power.

A-E-CO Lo-Hed HOISTS

AMERICAN ENGINEERING COMPANY
2484 ARAMINGO AVENUE, PHILADELPHIA, PA

assembled by plug welding in a similar manner. With plug welding completed, all stiffener pieces are welded to adjacent posts.

Sheathing then is welded in place. Side sheets and roof sheets are made as long as possible to minimize number of welded joints. A total of 24 vertical butt welds and 21 horizontal welds are acquired. These joints are backed by special 3/16-inch-thick channels as backing stiffeners. Although designed for ⅛-inch gaps at butt joints, camber of car causes joints to vary from 0 to ¼-inch. Zero gaps are chipped out and wide gaps filled by bridging every ¼-inch and then welding across the bridges. Skip method was employed, 4 inches being maximum length of any single bead. This cuts down distortion.

All sheathing joints were wedged out ⅛-inch before welding. It was found that seams had a tendency to draw from 1/16 to 5/32-inch after welding, but the ⅛-inch wedging made maximum draw only about 1/32-inch. Tolerance allowed for buckling was ⅛-inch in 4 feet.

Most troublesome sections in sheathing occurred at vestibule end of car where two 9-foot horizontal welds and one vertical weld from side sill to side roof purline are handled successfully after operators acquired sufficient technique in the skip method.

This, car was designed to accommodate four more passengers by elimination of vestibule at one end. Blind end of car is built up of light channels and Z-bars with special shapes to form a header to which end sheets are attached. These three end sheets are riveted to the header and welded to the side and roof sheets. As this welding is ground off so corners are absolutely square, the weld could be applied in one pass if fitup is perfect. However, slight errors in shearing necessitate two or three passes. This at first caused some buckling, which subsequently was eliminated by welding a good sized bead on inside joints of these sheets, thus compensating for the stresses set up.

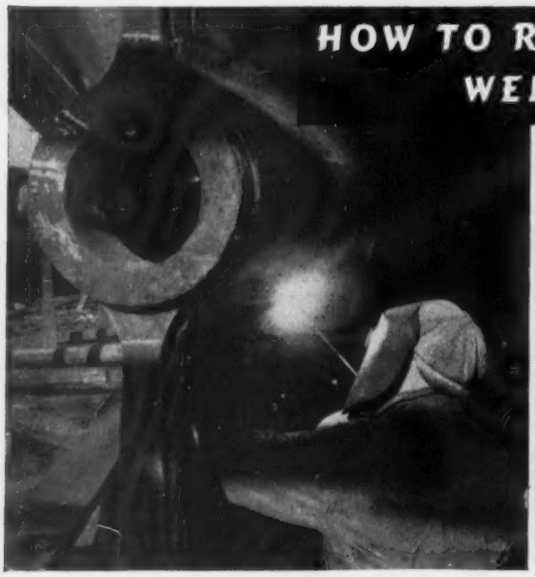
### T-Section Stiffener Used

After ends are completed, roof joints are made. Roof, of welded and riveted construction with plain butt joints, is welded with no backing stiffeners at the vestibule end for 4 feet. Twelve feet at the blind end and sixteen feet at the vestibule end consist of ⅛-inch sheet with welded joints, the remainder of the roof being 1/16-inch sheets riveted together. Method of preparing the welded joints is to flange one sheet about 1 inch and leave the other straight. This flanging is not entirely satisfactory as slight variations in flange radius and shearing make fitup difficult. Also, the flanged stiffener on the one sheet does not stiffen the adjoining sheet sufficiently. Although welding is done by tacking at short intervals and then skip welding, some buckling does occur. Use of a T-section stiffener is expected to eliminate this trouble.

Joints in roof over vestibule which have no support are welded using temporary backing strips with good results.

After welding is completed, outside welds are ground and polished, and inside stiffeners, insulation strips, etc., welded into place. After sand blasting, car is given a priming coat. Then any buckles present are hammered out and 20-gage galvanized floor sheets are welded onto the floor beams using ⅛-inch coated electrodes. With trucks and air brakes applied, the frame is ready for shipment.

It is thought that cost of welding can be cut and a better job produced if sheets are spot welded to superstructure instead of being plug welded through holes in the posts. Thus posts would be stronger and a better job could be done in about one-fourth of the time now required. Also, it is possible to spot weld the floor sheets to floor beams in only half the time now required, greatly cutting welding and electrode cost.

HOW TO REDUCE YOUR WELDING COSTS

From coast to coast, in plants fabricating welded structures of every description, Murex electrodes are helping to reduce welding costs. The reasons why are many. In one plant high burn-off rate may prove an advantage. In another, rapid deposition, or lack of spatter and smoothness of deposit may do the trick.

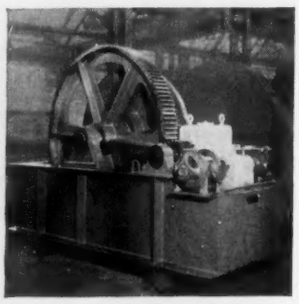
There is little question but what, in your plant, too, these Murex features can effect real economies. Why not write today and ask to have a representative demonstrate Murex. No obligation is involved. And, if you have a problem or two concerning welding procedure, his broad experience may prove extremely useful.

1 In marine work, vertical and overhead welding goes easily and quickly with Murex Vertex (reverse polarity) or Genex (straight polarity). *Photo courtesy Ira S. Bushey & Sons Co., Inc., Brooklyn, N. Y.*

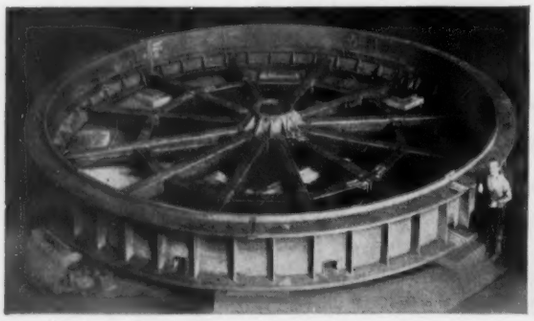
We've a pocket-size pamphlet giving properties of all electrodes in the Murex line. Send for your copy.

2 Only 2700 lbs. of Murex welded this 40,000 lbs. jacketed still. *Photo courtesy John Nooter Boiler Works Co., St. Louis, Mo.*

3 High speed deposition saves time and money on the Lorain 79 Shovel. *Photo courtesy The Thew Shovel Company, Lorain, Ohio.*



5 Economy of welding machinery such as this sluice gate hoist is increased by time-saving Murex Electrodes. *Photo courtesy Lakeside Bridge & Steel Co., Milwaukee, Wis.*



4 Free-flowing Murex downhand electrodes speeded welding on this 96,200 lb. pot chuck, 33 ft. 7 in. in diameter, believed to be world's largest. *Photo courtesy Lukenweld, Inc., Coatesville, Pa.*

MUREX
HEAVY COATED
ELECTRODES

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Albany • Chicago • Pittsburgh
So. San Francisco • Toronto

# Shipments Holding; Future Buying Off

## Demand Unusually Well Sustained; Output Down Slightly

**MARKET IN TABLOID ★**

*Demand*
*Heavy, despite letdown in forward coverage.*

*Prices*
*Unchanged; scrap still tending downward.*

*Production*
*Declined 1½ points to 92½ per cent.*

■ RELAXATION in steel market activity is confined principally to a tapering in forward orders. Shipments generally are sustained, and ingot production has been reduced but little from its recent peak. Last week steelmaking declined 1½ points to 92½ per cent, compared with a 3-point drop to 58 per cent a year ago.

Encouraging signs that steel consumption is well maintained, particularly for this period, are seen in several directions. Mills still are being pressed for current shipments in the face of approaching inventory-taking and notwithstanding reaffirmation of prices for next quarter on most products. Warehouse sales, sensitive to seasonal influences, are declining more slowly than usual in a number of districts.

Some requests have been received for postponement of shipments until January, but these are few, and heavy deliveries will continue through the year-end. The smaller volume of new business, reflecting previous forward coverage, is permitting some reduction in backlogs. However, the margin is relatively small and will enable producers to enter the new year with heavy unfilled orders.

Resumption of active buying is not looked for immediately after the turn of the year. Many users already are protected on the major portion of next quarter's needs, inventories have been enlarged to accommodate the increased consumption and mills are in a better position to fill the heavier requirements. Expectations of unchanged prices, at least for the near future, also tended to discourage forward buying.

Price developments include an increase, effective Jan. 1, in base quotations on chromium alloys and slight adjustments on certain other alloys, principally affecting small quantities. Base prices on most leading ferroalloys have been reaffirmed for next quarter. Iron and steel scrap prices continue soft under the influence of quiet mill buying. The scrap composite is off 25 cents to $17.75, compared with the October peak of $22.16 and with monthly averages of $17.97 in September and $15.30 in August.

Automobile production continues the pace-setter among steel users. Assemblies last week rose 2317 units to 117,805, best figure since July, 1937. Operations reached their fourth quarter peak a year ago with output of 102,905 units. All-time record for weekly production is 153,647 units, attained in 1929.

Some structural fabricators still have fairly large backlogs and shipments of concrete reinforcing bars continue heavy, but a dearth of inquiries for these products is noted in certain areas. Outstanding shape award is 10,175 tons for a refining plant for Phelps Dodge Corp. Other large private projects include 4900 tons of plates for Pennsylvania railroad car floats and lighters and 2900 tons of shapes for a Bell Telephone Laboratories building.

Steel specifications for freight car building continue active, and heavier releases of plates for shipbuilding are in prospect next month. Unfilled orders for cars and ships are large, but few additional purchases are actively pending. Most railroads have completed the major portion of their equipment buying programs and for the present at least are expected to remain out of the market.

Tin plate production has slipped to 92 per cent, largely the result of the season. Shipments will continue curtailed until January, when material accumulated by the mills will be released.

Pig iron shipments in most districts are at or above the November rate. The holiday period letdown is expected to result in little change for December as a whole. As in steel products forward pig iron buying is quieter, consumers already having contracted for needs early next year. Increased export buying of pig iron is indicated for 1940.

Final figures on the season's shipments of Lake Superior iron ore from upper lake ports show a movement of 45,072,724 gross tons. This was a gain of almost 134 per cent over 1938 and, with the exception of 1937, was the largest since 1930.

Curtailment in steelmaking last week resulted partly from mechanical causes but in some cases reflected a previous excess compared with rolling capacity. Reductions included 1 point to 93 at Pittsburgh, 1½ points to 92½ at Chicago, 8 points to 85 at Wheeling, 11 points to 69 at Cincinnati and 2 points to 94 at Detroit. Gains were 3 points to 93 in New England, 2 points to 85 at St. Louis and ½ point to 90 at Cleveland. Unchanged were eastern Pennsylvania at 88, Buffalo at 90, Birmingham at 94 and Youngstown at 93.

# COMPOSITE MARKET AVERAGES

| | Dec. 16 | Dec. 9 | Dec. 2 | One Month Ago Nov., 1939 | Three Months Ago Sept., 1939 | One Year Ago Dec., 1938 | Five Years Ago Dec., 1934 |
|---|---|---|---|---|---|---|---|
| Iron and Steel .... | $37.19 | $37.26 | $37.26 | $37.50 | $36.67 | $36.36 | $32.39 |
| Finished Steel .... | 56.10 | 56.10 | 56.10 | 55.90 | 55.60 | 56.50 | 54.00 |
| Steelworks Scrap.. | 17.75 | 18.00 | 18.33 | 20.06 | 17.97 | 14.77 | 11.02 |

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

## Finished Material

| | Dec. 16, 1939 | Nov. 1939 | Sept. 1939 | Dec. 1938 |
|---|---|---|---|---|
| Steel bars, Pittsburgh | 2.15c | 2.15c | 2.15c | 2.25c |
| Steel bars, Chicago | 2.15 | 2.15 | 2.15 | 2.15 |
| Steel bars, Philadelphia | 2.47 | 2.47 | 2.47 | 2.57 |
| Iron bars, Terre Haute, Ind. | 2.15 | 2.15 | 2.125 | 2.05 |
| Shapes, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Shapes, Philadelphia | 2.215 | 2.215 | 2.215 | 2.215 |
| Shapes, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Philadelphia | 2.15 | 2.15-2.40 | 2.15 | 2.15 |
| Plates, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, hot-rolled, Pittsburgh | 2.10 | 2.00 | 2.00 | 2.15 |
| Sheets, cold-rolled, Pittsburgh | 3.05 | 3.05 | 3.05 | 3.20 |
| Sheets, No. 24 galv., Pittsburgh | 3.50 | 3.50 | 3.50 | 3.50 |
| Sheets, hot-rolled, Gary | 2.10 | 2.00 | 2.00 | 2.00 |
| Sheets, cold-rolled, Gary | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Gary | 3.50 | 3.50 | 3.50 | 3.50 |
| Bright bess., basic wire, Pitts. | 2.60 | 2.60 | 2.60 | 2.60 |
| Tin plate, per base box, Pitts. | $5.00 | $5.00 | $5.00 | $5.00 |
| Wire nails, Pittsburgh | 2.55 | 2.55 | 2.40 | 2.45 |

## Semifinished Material

| | | | | |
|---|---|---|---|---|
| Sheet bars, Pittsburgh, Chicago. | $34.00 | $34.00 | $34.00 | $34.00 |
| Slabs, Pittsburgh, Chicago | 34.00 | 34.00 | 34.00 | 34.00 |
| Rerolling billets, Pittsburgh | 34.00 | 34.00 | 34.00 | 34.00 |
| Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts. | 2.00 | 1.92 | 1.92 | 1.92 |

## Pig Iron

| | Dec. 16, 1939 | Nov. 1939 | Sept. 1939 | Dec. 1938 |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $24.34 | $24.34 | $23.35 | $22.34 |
| Basic, Valley | 22.50 | 22.50 | 21.50 | 20.50 |
| Basic, eastern, del. Philadelphia | 24.34 | 24.34 | 23.54 | 22.34 |
| No. 2 foundry, Pittsburgh | 24.21 | 24.21 | 23.20 | 22.21 |
| No. 2 foundry, Chicago | 23.00 | 23.00 | 23.00 | 22.20 |
| Southern No. 2, Birmingham | 19.38 | 19.38 | 18.58 | 17.38 |
| Southern No. 2, del. Cincinnati | 22.89 | 22.89 | 22.09 | 20.89 |
| No. 2X, del. Phila. (differ. av.) | 25.215 | 25.215 | 24.415 | 23.215 |
| Malleable, Valley | 23.00 | 23.00 | 22.00 | 21.00 |
| Malleable, Chicago | 23.00 | 23.00 | 23.00 | 22.50 |
| Lake Sup., charcoal, del. Chicago | 30.34 | 30.34 | 30.34 | 29.84 |
| Gray forge, del. Pittsburgh | 23.17 | 23.17 | 22.15 | 21.17 |
| Ferromanganese, del. Pittsburgh | 105.33 | 105.33 | 95.35 | 97.77 |

## Scrap

| | | | | |
|---|---|---|---|---|
| Heavy melting steel, Pittsburgh | $18.00 | $21.90 | $18.75 | $15.50 |
| Heavy melt. steel, No. 2, E. Pa. | 17.50 | 19.25 | 17.10 | 13.20 |
| Heavy melting steel, Chicago | 16.75 | 17.45 | 19.25 | 16.05 |
| Rails for rolling, Chicago | 19.75 | 20.50 | 21.90 | 19.65 |
| Railroad steel specialties, Chicago | 20.25 | 21.50 | 21.75 | 18.00 |

## Coke

| | | | | |
|---|---|---|---|---|
| Connellsville, furnace, ovens | $4.75 | $5.00 | $3.75 | $3.75 |
| Connellsville, foundry, ovens | 5.75 | 6.00 | 5.00 | 5.00 |
| Chicago, by-product fdry., del. | 10.50 | 11.25 | 10.50 | 10.50 |

# STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

*Except when otherwise designated, prices are base, f.o.b. cars.*

## Sheet Steel

**Hot Rolled**

| | |
|---|---|
| Pittsburgh | 2.10c |
| Chicago, Gary | 2.10c |
| Cleveland | 2.10c |
| Detroit, del. | 2.20c |
| Buffalo | 2.10c |
| Sparrows Point, Md. | 2.10c |
| New York, del. | 2.34c |
| Philadelphia, del. | 2.27c |
| Granite City, Ill. | 2.20c |
| Middletown, O. | 2.10c |
| Youngstown, O. | 2.10c |
| Birmingham | 2.10c |
| Pacific Coast points | 2.60c |

**Cold Rolled**

| | |
|---|---|
| Pittsburgh | 3.05c |
| Chicago, Gary | 3.05c |
| Buffalo | 3.05c |
| Cleveland | 3.05c |
| Detroit, delivered | 3.15c |
| Philadelphia, del. | 3.37c |
| New York, del. | 3.39c |
| Granite City, Ill. | 3.15c |
| Middletown, O. | 3.05c |
| Youngstown, O. | 3.05c |
| Pacific Coast points | 3.65c |

**Galvanized No. 24**

| | |
|---|---|
| Pittsburgh | 3.50c |
| Chicago, Gary | 3.50c |
| Buffalo | 3.50c |
| Sparrows Point, Md. | 3.50c |
| Philadelphia, del. | 3.67c |
| New York, delivered | 3.74c |
| Birmingham | 3.50c |
| Granite City, Ill. | 3.60c |
| Middletown, O. | 3.50c |
| Youngstown, O. | 3.50c |
| Pacific Coast points | 4.00c |

**Black Plate, No. 29 and Lighter**

| | |
|---|---|
| Pittsburgh | 3.05c |
| Chicago, Gary | 3.05c |
| Granite City, Ill. | 3.15c |

**Long Ternes No. 24 Unassorted**

| | |
|---|---|
| Pittsburgh, Gary | 3.80c |
| Pacific Coast | 4.50c |

**Enameling Sheets**

| | No. 10 | No. 20 |
|---|---|---|
| Pittsburgh | 2.75c | 3.35c |
| Chicago, Gary | 2.75c | 3.35c |
| Granite City, Ill. | 2.85c | 3.45c |
| Youngstown, O. | 2.75c | 3.35c |
| Cleveland | 2.75c | 3.35c |
| Middletown, O. | 2.75c | 3.35c |
| Pacific Coast | 3.35c | 3.95c |

## Corrosion and Heat-Resistant Alloys

*Pittsburgh base, cents per lb.*

**Chrome-Nickel**

| | No. 302 | No. 304 |
|---|---|---|
| Bars | 24.00 | 25.00 |
| Plates | 27.00 | 29.00 |
| Sheets | 34.00 | 36.00 |
| Hot strip | 21.50 | 23.50 |
| Cold strip | 28.00 | 30.00 |

**Straight Chromes**

| | No. 410 | No. 430 | No. 442 | No. 446 |
|---|---|---|---|---|
| Bars | 18.50 | 19.00 | 22.50 | 27.50 |
| Plates | 21.50 | 22.00 | 25.50 | 30.50 |
| Sheets | 26.50 | 29.00 | 32.50 | 36.50 |
| Hot strip | 17.00 | 17.50 | 24.00 | 35.00 |
| Cold stp. | 22.00 | 22.50 | 32.00 | 52.00 |

## Steel Plate

| | |
|---|---|
| Pittsburgh | 2.10c |
| New York, del. | 2.29c |
| Philadelphia, del. | 2.15c-2.40c |
| Boston, delivered | 2.46c |
| Buffalo, delivered | 2.33c |
| Chicago or Gary | 2.10c |
| Cleveland | 2.10c |
| Birmingham | 2.10c |
| Coatesville, Pa. | 2.35c |
| Sparrows Point, Md. | 2.10c |
| Claymont, Del. | 2.10c-2.35c |
| Youngstown | 2.10c |
| Gulf ports | 2.45c |
| Pacific Coast points | 2.60c |

**Steel Floor Plates**

| | |
|---|---|
| Pittsburgh | 3.35c |
| Chicago | 3.35c |
| Gulf ports | 3.70c |
| Pacific Coast ports | 3.95c |

## Standard Shapes

| | |
|---|---|
| Pittsburgh | 2.10c |
| Philadelphia, del. | 2.21½c |
| New York, del. | 2.27c |
| Boston, delivered | 2.41c |
| Bethlehem | 2.10c |
| Chicago | 2.10c |
| Cleveland, del. | 2.30c |
| Buffalo | 2.10c |
| Gulf ports | 2.45c |
| Birmingham | 2.10c |
| St. Louis, del. | 2.34c |
| Pacific Coast points | 2.70c |

## Tin and Terne Plate

**Tin Plate, Coke (base box)**

| | |
|---|---|
| Pittsburgh, Gary, Chicago | $5.00 |
| Granite City, Ill. | 5.10 |

**Mfg. Terne Plate (base box)**

| | |
|---|---|
| Pittsburgh, Gary, Chicago | $4.30 |
| Granite City, Ill. | 4.40 |

## Bars

**Soft Steel**

*(Base, 20 tons or over)*

| | |
|---|---|
| Pittsburgh | 2.15c |
| Chicago or Gary | 2.15c |
| Duluth | 2.25c |
| Birmingham | 2.15c |
| Cleveland | 2.15c |
| Buffalo | 2.15c |
| Detroit, delivered | 2.25c |
| Philadelphia, del. | 2.47c |
| Boston, delivered | 2.52c |
| New York, del. | 2.49c |
| Gulf ports | 2.50c |
| Pacific Coast points | 2.75c |

**Rail Steel**

*(Base, 5 tons or over)*

| | |
|---|---|
| Pittsburgh | 2.15c |
| Chicago or Gary | 2.15c |
| Detroit, delivered | 2.25c |
| Cleveland | 2.15c |

| | |
|---|---|
| Buffalo | 2.15c |
| Birmingham | 2.15c |
| Gulf ports | 2.50c |
| Pacific Coast points | 2.75c |

**Iron**

| | |
|---|---|
| Chicago, Terre Haute | 2.15c |
| Philadelphia | 2.37c |
| Pittsburgh, refined | 3.50-8.00c |

**Reinforcing**

*New Billet Bars, Base**

| | |
|---|---|
| Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts. | 2.15c |
| Gulf ports | 2.50c |
| Pacific Coast ports | 2.60c |

*Rail Steel Bars, Base**

| | |
|---|---|
| Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm. | 2.15c |
| Gulf ports | 2.50c |
| Pacific Coast ports | 2.60c |

**Subject to a deduction of 25 cents per 100 lbs. in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.*

## Wire Products

*Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads*

| | |
|---|---|
| Standard and cement coated wire nails | $2.55 |
| (Per pound) | |
| Polished fence staples | 2.55c |
| Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.88; two-point cattle, 80-rod spool | $2.70 |
| Annealed fence wire | 2.90c |
| Galv. fence wire | 3.30c |
| Woven wire fencing (base C. L. column) | 67.00 |
| Single loop bale tie, (base C. L. column) | 56.00 |

**To Manufacturing Trade**

*Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)*

| | |
|---|---|
| Bright bess., basic wire | 2.60c |
| Galvanized wire | 2.65c |
| Spring wire | 3.20c |

Worcester, Mass., $2 higher on bright basic and spring wire.

## Cut Nails

Carload, Pittsburgh ..... $3.70

## Cold-Finished Bars

| | Carbon | Alloy |
|---|---|---|
| Pittsburgh | 2.65c | 3.35c |
| Chicago | 2.65c | 3.35c |
| Gary, Ind. | 2.65c | 3.35c |
| Detroit | 2.70c | *3.45c |
| Cleveland | 2.65c | 3.35c |
| Buffalo | 2.65c | 3.35c |

* Delivered.

## Alloy Bars (Hot)

(Base, 20 tons or over)

| | |
|---|---|
| Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem | 2.70c |
| Detroit, delivered | 2.80c |

| Alloy S.A.E. | Diff. | Alloy S.A.E. | Diff. |
|---|---|---|---|
| 2000 | 0.35 | 3100 | 0.70 |
| 2100 | 0.75 | 3200 | 1.35 |
| 2300 | 1.55 | 3300 | 3.80 |
| 2500 | 2.25 | 3400 | 3.20 |

| | |
|---|---|
| 4100 0.15 to 0.25 Mo. | 0.55 |
| 4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. | 1.10 |
| 5100 0.80-1.10 Cr. | 0.45 |
| 5100 Cr. spring flats | 0.15 |
| 6100 bars | 1.20 |
| 6100 spring flats | 0.85 |
| Cr. N., Van. | 1.50 |
| Carbon Van. | 0.85 |
| 9200 spring flats | 0.15 |
| 9200 spring rounds, squares | 0.40 |

Electric furnace up 50 cents.

## Strip and Hoops

*(Base, hot strip, 1 ton or over; cold, 3 tons or over)*

**Hot Strip, 12-inch and less**

| | |
|---|---|
| Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham | 2.10c |
| Detroit, del. | 2.20c |
| Philadelphia, del. | 2.42c |
| New York, del. | 2.46c |
| Pacific Coast points | 2.70c |
| Cooperage hoop, Youngs., Pitts.; Chicago, Birm. | 2.20c |
| Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown | 2.80c |
| Chicago | 2.90c |
| Detroit, del. | 2.90c |
| Worcester, Mass. | 3.00c |

| Carbon | Cleve., Pitts. |
|---|---|
| 0.26—0.50 | 2.80c |
| 0.51—0.75 | 4.30c |
| 0.76—1.00 | 6.15c |
| Over 1.00 | 8.35c |

Worcester, Mass. $4 higher.

**Commodity Cold-Rolled Strip**

| | |
|---|---|
| Pitts.-Cleve.-Youngstown | 2.95c |
| Chicago | 3.05c |
| Detroit, del. | 3.05c |
| Worcester, Mass. | 3.35c |

Lamp stock up 10 cents.

## Rails, Fastenings

*(Gross Tons)*

| | |
|---|---|
| Standard rails, mill | $40.00 |
| Relay rails, Pittsburgh 20—100 lbs. | 32.50-35.50 |
| Light rails, billet qual., Pitts., Chicago, B'ham. | $40.00 |
| Do., rerolling quality | 39.00 |

*Cents per pound*

| | |
|---|---|
| Angle bars, billet, mills | 2.70c |
| Do., axle steel | 2.35c |
| Spikes, R. R. base | 3.00c |
| Track bolts, base | 4.15c |
| Car axles forged, Pitts., Chicago, Birmingham | 3.15c |
| Tie plates, base | 2.15c |

Base, light rails 25 to 60 lbs., 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

## Bolts and Nuts

*F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, for full containers additional 10%.*

**Carriage and Machine**

| | |
|---|---|
| ½ x 6 and smaller | 68.5 off |
| Do. larger, to 1-in. | 66 off |
| Do. 1⅛ and larger | 64 off |
| Tire bolts | 52.5 off |

**Stove Bolts**

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

| | |
|---|---|
| Step bolts | 60 off |
| Plow bolts | 68.5 off |

**Nuts**

| Semifinished hex. | U.S.S. | S.A.E. |
|---|---|---|
| 6-inch and less | 67 | 70 |
| ⅞-1-inch | 64 | 65 |
| 1⅛ and larger | 62 | 62 |

**Hexagon Cap Screws**

Upset, 1-in., smaller 70.0 off

**Square Head Set Screws**

| | |
|---|---|
| Upset, 1-in., smaller | 75.0 off |
| Headless set screws | 64.0 off |

## Piling

| | |
|---|---|
| Pitts., Chgo., Buffalo | 2.40c |
| Gulf ports | 2.85c |
| Pacific coast ports | 2.90c |

## Rivets, Washers

| | |
|---|---|
| Structural, Pittsburgh, Cleveland, Chicago | 3.40c |
| ½-inch and smaller, Pitts., Chi., Cleve. | 65-10 off |
| Wrought washers, Pitts., Chi., Phila., to jobbers | |
| and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 | off |

## Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

**Butt Weld**

Steel

| In. | Blk. | Galv. |
|---|---|---|
| ⅛ | 63½ | 54 |
| ¼ | 66½ | 58 |
| ⅜—⅜ | 68½ | 60½ |

Iron

| | | |
|---|---|---|
| ⅜ | 30 | 13 |
| ½—1¼ | 34 | 19 |
| 1½ | 38 | 21½ |
| 2 | 37½ | 21 |

**Lap Weld**

Steel

| | | |
|---|---|---|
| 2 | 61 | 52½ |
| 2½—3 | 64 | 55½ |
| 3½—6 | 66 | 57½ |
| 7 and 8 | 65 | 55½ |
| 9 and 10 | 64½ | 55 |
| 11 and 12 | 63½ | 54 |

Iron

| | | |
|---|---|---|
| 2 | 30½ | 15 |
| 2½—3½ | 31½ | 17½ |
| 4 | 33½ | 21 |
| 4½—8 | 32½ | 20 |
| 9—12 | 28½ | 15 |

**Line Pipe**

Steel

| | |
|---|---|
| 1 to 3, butt weld | 67½ |
| 2, lap weld | 60 |
| 2½ to 3, lap weld | 63 |
| 3½ to 6, lap weld | 65 |
| 7 and 8, lap weld | 64 |
| 10-inch lap weld | 63½ |
| 12-inch, lap weld | 62½ |

Iron

| | Blk. | Galv. |
|---|---|---|
| ¾ butt weld | 25 | 7 |
| 1 and 1¼ butt weld | 29 | 13 |
| 1½ butt weld | 33 | 15½ |
| 2 butt weld | 32½ | 15 |
| 1½ lap weld | 23½ | 7 |
| 2 lap weld | 25½ | 9 |
| 2½ to 3½ lap weld | 26½ | 11½ |
| 4 lap weld | 28½ | 15 |
| 4½ to 8 lap weld | 27½ | 14 |
| 9 to 12 lap weld | 23½ | 9 |

## Boiler Tubes

*Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.*

**Lap Welded**

| Sizes | Gage | Steel | Charcoal Iron |
|---|---|---|---|
| 1½" O.D. | 13 | $ 9.72 | $23.71 |
| 1¾" O.D. | 13 | 11.06 | 22.93 |
| 2" O.D. | 13 | 12.38 | 19.35 |
| 2¼" O.D. | 13 | 13.79 | 21.68 |
| 2¼" O.D. | 12 | 15.16 | ..... |
| 2½" O.D. | 12 | 16.58 | 26.57 |
| 2¾" O.D. | 12 | 17.54 | 29.00 |
| 3" O.D. | 12 | 18.35 | 31.36 |
| 3½" O.D. | 11 | 23.15 | 39.81 |
| 4" O.D. | 10 | 28.66 | 49.90 |
| 5" O.D. | 9 | 44.25 | 73.93 |
| 6" O.D. | 7 | 68.14 | ..... |

**Seamless**

| Sizes | Gage | Hot Rolled | Cold Drawn |
|---|---|---|---|
| 1" O.D. | 13 | $ 7.82 | $ 9.01 |
| 1⅛" O.D. | 13 | 9.26 | 10.67 |
| 1½" O.D. | 13 | 10.23 | 11.79 |
| 1¾" O.D. | 13 | 11.64 | 13.42 |
| 2" O.D. | 13 | 13.04 | 15.03 |
| 2¼" O.D. | 13 | 14.54 | 16.76 |
| 2¼" O.D. | 12 | 16.01 | 18.45 |
| 2½" O.D. | 12 | 17.54 | 20.21 |
| 2¾" O.D. | 12 | 18.59 | 21.42 |
| 3" O.D. | 12 | 19.50 | 22.48 |
| 3½" O.D. | 11 | 24.62 | 28.37 |
| 4" O.D. | 10 | 30.54 | 35.20 |
| 4½" O.D. | 10 | 37.35 | 43.04 |
| 5" O.D. | 9 | 46.87 | 54.01 |
| 6" O.D. | 7 | 71.96 | 82.93 |

## Cast Iron Pipe

*Class B Pipe—Per Net Ton*

| | |
|---|---|
| 6-in., & over, Birm. | $45.00-46.00 |
| 4-in., Birmingham | 48.00-49.00 |
| 4-in., Chicago | 56.80-57.80 |
| 6-in. & over, Chicago | 53.80-54.80 |
| 6-in. & over, east fdy. | 49.00 |
| Do., 4-in. | 52.00 |

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

## Semifinished Steel

**Rerolling Billets, Slabs**

*(Gross Tons)*

| | |
|---|---|
| Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point | $34.00 |
| Duluth (billets) | 36.00 |
| Detroit, delivered | 36.00 |

**Forging Quality Billets**

| | |
|---|---|
| Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm. | 40.00 |
| Duluth | 42.00 |

**Sheet Bars**

| | |
|---|---|
| Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago | 34.00 |
| Detroit, delivered | 36.00 |

**Wire Rods**

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 41/64-in. incl. 2.15
Worcester up $0.10; Galveston up $0.30; Pacific Coast up $0.45.

**Skelp**

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

## Coke

*Price Per Net Ton*

**Beehive Ovens**

| | |
|---|---|
| Connellsville, fur. | $4.75- 5.25 |
| Connellsville, fdry. | 5.50- 6.00 |
| Connell. prem. fdry. | 5.75- 6.25 |
| New River fdry. | 6.50- 6.75 |
| Wise county fdry | 5.50- 6.50 |
| Wise county fur. | 5.00- 5.25 |

**By-Product Foundry**

| | |
|---|---|
| Newark, N. J., del. | 11.38-11.85 |
| Chicago, outside del. | 10.50 |
| Chicago, delivered | 11.25 |
| Terre Haute, del. | 10.75 |
| Milwaukee, ovens | 11.25 |
| New England, del. | 12.50 |
| St. Louis, del. | 11.75 |
| Birmingham, ovens | 7.50 |
| Indianapolis, del. | 10.75 |
| Cincinnati, del. | 10.50 |
| Cleveland, del. | 11.05 |
| Buffalo, del. | 11.25 |
| Detroit, del. | 11.00 |
| Philadelphia, del. | 11.15 |

## Coke By-Products

*Spot, gal., freight allowed east of Omaha*

| | |
|---|---|
| Pure and 90% benzol | 16.00c |
| Toluol, two degree | 22.00c |
| Solvent naphtha | 26.00c |
| Industrial xylol | 26.00c |

*Per lb. f.o.b. Frankford and St. Louis*

| | |
|---|---|
| Phenol (less than 1000 lbs.) | 14.75c |
| Do. (1000 lbs. or over) | 13.75c |

*Eastern Plants, per lb.*

| | |
|---|---|
| Naphthalene flakes, balls, bbls. to jobbers | 6.75c |

*Per ton, bulk, f.o.b. port*

| | |
|---|---|
| Sulphate of ammonia | $28.00 |

## Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

| Basing Points: | No. 2 Fdry. | Malleable | Basic | Bessemer |
|---|---|---|---|---|
| Bethlehem, Pa. | $24.00 | $24.50 | $23.50 | $25.00 |
| Birdsboro, Pa. | 24.00 | 24.50 | 23.50 | 25.00 |
| Birmingham, Ala.‡ | 19.38 | ..... | 18.38 | 24.00 |
| Buffalo | 23.00 | 23.50 | 22.00 | 24.00 |
| Chicago | 23.00 | 23.00 | 22.50 | 23.50 |
| Cleveland | 23.00 | 23.00 | 22.50 | 23.50 |
| Detroit | 23.00 | 23.00 | 22.50 | 23.50 |
| Duluth | 23.50 | 23.50 | ..... | 24.00 |
| Erie, Pa. | 23.00 | 23.50 | 22.50 | 24.00 |
| Everett, Mass. | 24.00 | 24.50 | 23.50 | 25.00 |
| Granite City, Ill. | 23.00 | 23.00 | 22.50 | 23.50 |
| Hamilton, O. | 23.00 | 23.00 | 22.50 | ..... |
| Neville Island, Pa. | 23.00 | 23.00 | 22.50 | 23.50 |
| Provo, Utah | 21.00 | ..... | ..... | ..... |
| Sharpsville, Pa. | 23.00 | 23.00 | 22.50 | 23.50 |
| Sparrow's Point, Md. | 24.00 | ..... | 23.50 | ..... |
| Swedeland, Pa. | 24.00 | 24.50 | 23.50 | 25.00 |
| Toledo, O. | 23.00 | 23.00 | 22.50 | 23.50 |
| Youngstown, O. | 23.00 | 23.00 | 22.50 | 23.50 |

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

| Delivered from Basing Points: | | | | |
|---|---|---|---|---|
| Akron, O., from Cleveland | 24.39 | 24.39 | 23.89 | 24.89 |
| Baltimore from Birmingham | 24.78 | ..... | 23.66 | ..... |
| Boston from Birmingham | 24.12 | ..... | ..... | ..... |
| Boston from Everett, Mass. | 24.50 | 25.00 | 24.00 | 25.50 |
| Boston from Buffalo | 24.50 | 25.00 | 24.00 | 25.50 |
| Brooklyn, N. Y., from Bethlehem | 26.50 | 27.00 | ..... | ..... |
| Canton, O., from Cleveland | 24.39 | 24.39 | 23.89 | 24.89 |
| Chicago from Birmingham | †23.22 | ..... | ..... | ..... |
| Cincinnati from Hamilton, O. | 23.24 | 24.11 | 23.61 | ..... |
| Cincinnati from Birmingham | 23.06 | ..... | 22.06 | ..... |
| Cleveland from Birmingham | 23.32 | ..... | 22.82 | ..... |
| Mansfield, O., from Toledo, O. | 24.94 | 24.94 | 24.44 | 24.44 |
| Milwaukee from Chicago | 24.10 | 24.10 | 23.60 | 24.60 |
| Muskegon, Mich., from Chicago, Toledo or Detroit | 26.19 | 26.19 | 25.69 | 26.69 |
| Newark, N. J., from Birmingham | 25.15 | ..... | ..... | ..... |
| Newark, N. J., from Bethlehem | 25.53 | 26.03 | ..... | ..... |
| Philadelphia from Birmingham | 24.46 | ..... | 23.96 | ..... |
| Philadelphia from Swedeland, Pa. | 24.84 | 25.34 | 24.34 | ..... |
| Pittsburgh district from Neville Island | Neville base, plus 69c, 84c, and $1.24 freight. | | | |
| Saginaw, Mich., from Detroit | 25.45 | 25.45 | 24.95 | 24.95 |

| | No. 2 Fdry. | Malleable | Basic | Bessemer |
|---|---|---|---|---|
| St. Louis, northern | 23.50 | 23.50 | 23.00 | .... |
| St. Louis from Birmingham | †23.12 | .... | 22.62 | .... |
| St. Paul from Duluth | 25.63 | 25.63 | .... | 26.13 |

†Over 0.70 phos.

**Low Phos.**

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

| Gray Forge | | Charcoal | |
|---|---|---|---|
| Valley furnace | $22.50 | Lake Superior fur. | $27.00 |
| Pitts. dist. fur. | 22.50 | do., del. Chicago | 30.34 |
| | | Lyles, Tenn. | 26.50 |

**†Silvery**

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo, $1.25 higher.

**Bessemer Ferrosilicon†**

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

## Refractories

*Per 1000 f.o.b. Works, Net Prices*

**Fire Clay Brick**

*Super Quality*

| | |
|---|---|
| Pa., Mo., Ky. | $60.80 |

*First Quality*

| | |
|---|---|
| Pa., Ill., Md., Mo., Ky. | 47.50 |
| Alabama, Georgia | 47.50 |
| New Jersey | 52.50 |

*Second Quality*

| | |
|---|---|
| Pa., Ill., Ky., Md., Mo. | 42.75 |
| Georgia, Alabama | 34.20 |
| New Jersey | 49.00 |

Ohio

| | |
|---|---|
| First quality | 39.90 |
| Intermediate | 36.10 |
| Second quality | 31.35 |

**Malleable Bung Brick**

| | |
|---|---|
| All bases | $56.05 |

**Silica Brick**

| | |
|---|---|
| Pennsylvania | $47.50 |
| Joliet, E. Chicago | 55.10 |
| Birmingham, Ala. | 47.50 |

**Ladle Brick**

*(Pa., O., W. Va., Mo.)*

| | |
|---|---|
| Dry press | $28.00 |
| Wire cut | $26.00 |

**Magnesite**

| | |
|---|---|
| Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags) | $45.00 |
| Do. domestic | 40.00 |
| Do., f.o.b. Chewelah, Wash., net ton, bulk | 22.00 |
| net ton, bags | 26.00 |
| Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk | 22.00 |

**Basic Brick**

*Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.*

| | |
|---|---|
| Chrome brick | $47.00 |
| Chem. bonded chrome | 47.00 |
| Magnesite brick | 67.00 |
| Chem. bonded magnesite | 57.00 |

## Fluorspar

| | |
|---|---|
| Washed gravel, duty pd., tide, net ton | $25.00-$26.00 |
| Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail | 22.00 |
| Do. barge | 22.00 |
| No. 2 lump | 22.00 |

## Ferroalloy Prices

**Ferromanganese,** 78-82%, tide., duty pd. $100.00
Do., del. Pitts., 105.33

**Spiegeleisen,** 19-21% dom. Palmerton, Pa., spot 32.00
Do., 26-28% 39.50

**Ferrosilicon,** 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

**Silicomanganese,** 2½ c. 103.00
2% carbon, 108.00; 1%, 118.00
Contract ton price $11 higher; spot $5 over contract.

**Ferrotungsten,** stand., lb. con. del. cars 2.00-2.10

**Ferrovanadium,** 35 to 40%, lb., cont. 2.70-2.80-2.90

**Ferrophosphorus,** gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

**Ferrochrome,** 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c
67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

| | Carloads | Ton lots | Less ton |
|---|---|---|---|
| 2% carb. | 16.50c | 17.25c | 17.75c |
| 1% carb. | 17.50c | 18.25c | 18.75c |
| 0.10% carb. | 19.50c | 20.25c | 20.75c |
| 0.20% carb. | 18.50c | 19.25c | 19.75c |

Spot ¼c higher

**Ferromolybdenum,** 55-65% molyb. cont., f.o.b. mill, lb. 0.95

**Calcium molybdate,** lb. molyb. cont., f.o.b. mill 0.80

**Ferrotitanium,** 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

**Ferrocolumbium,** 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

**Technical molybdenum trioxide,** 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

**Ferro-carbon-titanium,** 15-18%, tl., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00
15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

**Alsifer,** contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

**Chromium Briquets,** contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

**Tungsten Metal Powder,** according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

**Vanadium Pentoxide,** contract, lb. contained $1.10
Do, spot 1.15

**Chromium Metal,** 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

**Silicon Metal,** 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

**Silicon Briquets,** contract carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

**Manganese Briquets,** contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

**Zirconium Alloy,** 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

**Molybdenum Powder,** 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

**Molybdenum Oxide Briquets,** 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials*

| | Soft Bars | Bands | Hoops | Plates ¼-in. & Over | Structural Shapes | Floor Plates | Sheets: Hot Rolled | Sheets: Cold Rolled | Sheets: Galv. No. 24 | Cold Rolled Strip | Cold Drawn Bars: Carbon | Cold Drawn Bars: SAE 2300 | Cold Drawn Bars: SAE 3100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boston | 3.98 | 4.06 | 5.06 | 3.85 | 3.85 | 5.66 | 3.71 | 4.78 | 4.86 | 3.46 | 4.13 | 8.63 | 7.23 |
| New York (Met.) | 3.84 | 3.96 | 3.96 | 3.76 | 3.75 | 5.56 | 3.58 | 4.60 | 5.23 | 3.51 | 4.09 | 8.59 | 7.19 |
| Philadelphia | 3.85 | 3.85 | 4.35 | 3.55 | 3.55 | 5.25 | 3.55 | 4.55 | 4.93 | 3.51 | 4.06 | 8.56 | 7.16 |
| Baltimore | 3.95 | 4.05 | 4.45 | 3.70 | 3.70 | 5.25 | 3.55 | .... | 5.05 | .... | 4.05 | .... | .... |
| Norfolk, Va. | 4.15 | 4.25 | .... | 3.90 | 3.90 | 5.45 | 3.75 | .... | 5.40 | .... | 4.15 | .... | .... |
| Buffalo | 3.35 | 3.82 | 3.82 | 3.62 | 3.40 | 6.40 | 4.20 | 4.40 | 4.50 | 3.42 | 3.75 | 8.15 | 6.75 |
| Pittsburgh | 3.35 | 3.60 | 3.60 | 3.40 | 3.40 | 5.00 | 3.35 | .... | 4.75 | 3.35 | 3.65 | 8.35 | 6.95 |
| Cleveland | 3.25 | 3.50 | 3.50 | 3.40 | 3.58 | 5.18 | 3.35 | 4.05 | 4.72 | 3.20 | 3.75 | 8.15 | 6.75 |
| Detroit | 3.58 | 3.68 | 3.68 | 3.75 | 3.80 | 5.42 | 3.43 | 4.50 | 4.84 | 3.40 | 3.80 | 8.45 | 7.05 |
| Cincinnati | 3.60 | 3.67 | 3.67 | 3.65 | 3.68 | 5.28 | 3.42 | 4.37 | 4.67 | 3.45 | 4.00 | 8.50 | 7.10 |
| Chicago | 3.50 | 3.60 | 3.60 | 3.55 | 3.55 | 5.15 | 3.35 | 4.30 | 4.85 | 3.50 | 3.75 | 8.15 | 6.75 |
| Twin Cities | 3.75 | 3.85 | 3.85 | 3.80 | 3.80 | 5.40 | 3.60 | 4.95 | 5.00 | 3.83 | 4.34 | 8.84 | 7.44 |
| Milwaukee | 3.63 | 3.73 | 3.73 | 3.68 | 3.68 | 5.28 | 3.48 | 4.43 | 4.98 | 3.54 | 3.88 | 8.38 | 6.98 |
| St. Louis | 3.62 | 3.72 | 3.72 | 3.47 | 3.47 | 5.07 | 3.38 | 4.32 | 4.52 | 3.61 | 4.02 | 8.52 | 7.12 |
| Kansas City | 4.05 | 4.15 | 4.15 | 4.00 | 4.00 | 5.60 | 3.90 | .... | 5.00 | .... | 4.30 | .... | .... |
| Memphis | 3.90 | 4.00 | 4.00 | 3.95 | 3.95 | 5.71 | 3.75 | .... | 5.00 | .... | 4.31 | .... | .... |
| Chattanooga | 3.80 | 3.90 | 3.90 | 3.85 | 3.85 | 5.68 | 3.65 | .... | 4.40 | .... | 4.39 | .... | .... |
| Tulsa, Okla. | 4.44 | 4.54 | 4.54 | 4.33 | 4.33 | 5.93 | 4.24 | .... | 5.71 | .... | 4.69 | .... | .... |
| Birmingham | 3.50 | 3.60 | 3.60 | 3.55 | 3.55 | 5.88 | 3.35 | .... | 4.85 | .... | 4.43 | .... | .... |
| New Orleans | 4.00 | 4.10 | 4.10 | 3.80 | 3.80 | 5.75 | 3.85 | .... | 4.80 | 5.00 | 4.60 | .... | .... |
| Houston, Tex. | 4.05 | 6.20 | 6.20 | 4.05 | 4.05 | 5.75 | 4.20 | .... | 5.25 | .... | .... | .... | .... |
| *Seattle | 4.00 | 3.85 | 5.20 | 3.40 | 3.50 | 5.75 | 3.70 | 6.50 | 4.75 | .... | 5.75 | .... | .... |
| Portland, Oreg. | 4.25 | 4.50 | 6.10 | 4.00 | 4.00 | 5.75 | 3.95 | 6.50 | 4.75 | .... | 5.75 | .... | .... |
| Los Angeles | 4.15 | 4.65 | 6.45 | 4.00 | 4.00 | 6.40 | 4.30 | 6.50 | 5.25 | .... | 6.60 | 10.65 | 9.80 |
| San Francisco | 4.00 | 4.45 | 6.00 | 4.00 | 4.00 | 5.60 | 3.85 | 6.40 | 5.15 | .... | 6.80 | 10.65 | 9.80 |

| | SAE Hot-rolled Bars (Unannealed): 1035-1050 | 2300 Series | 3100 Series | 4100 Series | 6100 Series |
|---|---|---|---|---|---|
| Boston | 4.18 | 7.50 | 6.05 | 5.80 | 7.90 |
| New York (Met.) | 4.04 | 7.35 | 5.90 | 5.65 | .... |
| Philadelphia | 4.10 | 7.31 | 5.86 | 5.61 | 8.56 |
| Baltimore | 4.10 | .... | .... | .... | .... |
| Norfolk, Va. | .... | .... | .... | .... | .... |
| Buffalo | 3.55 | 7.10 | 5.65 | 5.40 | 7.50 |
| Pittsburgh | 3.40 | 7.35 | 5.95 | 5.50 | 7.60 |
| Cleveland | 3.30 | 7.30 | 5.85 | 5.85 | 7.70 |
| Detroit | 3.63 | 7.42 | 5.97 | 5.72 | 7.19 |
| Cincinnati | 3.65 | 7.44 | 5.99 | 5.74 | 7.84 |
| Chicago | 3.70 | 7.10 | 5.65 | 5.40 | 7.50 |
| Twin Cities | 3.95 | 7.45 | 6.00 | 6.09 | 8.19 |
| Milwaukee | 3.83 | 7.33 | 5.88 | 5.63 | 7.73 |
| St. Louis | 3.82 | 7.47 | 6.02 | 5.77 | 7.87 |
| Seattle | 5.85 | .... | 8.00 | 7.85 | 8.65 |
| Portland, Oreg. | 5.70 | 8.85 | 8.00 | 7.85 | 8.65 |
| Los Angeles | 4.80 | 9.40 | 8.55 | 8.40 | 9.05 |
| San Francisco | 5.00 | 9.65 | 8.80 | 8.65 | 9.30 |

**BASE QUANTITIES**

**Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.**

**Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.**

Galvanized Sheets: Base, 0-1499 pounds in New York, 150-1499 pounds in Cleveland, Milwaukee, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, St. Louis, Tulsa; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

**Cold Rolled Strip: No base quantity; extras apply on lots of all size.**

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 or 2000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

# CURRENT IRON AND STEEL PRICES OF EUROPE

**Dollars at Rates of Exchange, Dec. 14**

## Export Prices f.o.b. Port of Dispatch—

*By Cable or Radio*

| | British gross tons U. K. ports £ s d | Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value | **Quoted in gold pounds sterling £ s d |
|---|---|---|---|
| Foundry, 2.50-3.00 Si. | $19.20 5 0 0 | $29.82 | 3 10 0 |
| Basic bessemer | ..... ..... | 19.59 | 2 6 0 |
| Hematite, Phos. .03-.05 | 20.69 5 5 0 | ..... | ..... |
| Billets | $29.06 7 7 6 | $31.95 | 3 15 0 |
| Wire rods, No. 5 gage | 44.82 11 7 6 | 60.71 | 7 2 6 |
| Standard rails | $37.43 9 10 0 | $48.99 | 5 15 0 |
| Merchant bars | 2.16c 12 5 0 | 2.90c | 7 12 6 |
| Structural shapes | 1.96c 11 2 6 | 2.81c | 7 8 0 |
| Plates, †¼ in. or 5 mm. | 1.93c 10 18 9 | 3.71c | 9 15 0 |
| Sheets, black, 24 gage or 0.5 mm | 2.75c 15 12 6 | 3.80c | 10 0 0° |
| Sheets, gal., 24 ga., corr. | 3.19c 18 2 6 | 4.66c | 12 5 0 |
| Bands and strips | 2.16c 12 5 0 | 2.80c | 7 7 6 |
| Plain wire, base | 3.43c 19 10 0 | 3.04c | 8 0 0 |
| Galvanized wire, base | 4.09c 23 5 0 | 3.61c to 3.66c | 9 10 0 to 9 12 6 |
| Wire nails, base | .... ..... | 3.52c | 9 5 0 |
| Tin plate, box 108 lbs. | $ 6.21 1 11 6 | ..... | ..... |

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

## Domestic Prices at Works or Furnace—

*Last Reported*

| | £ s d | | French Francs | | Belgian Francs | | Reich §§Mark | |
|---|---|---|---|---|---|---|---|---|
| Fdy. pig iron, Si. 2.5 | $21.28 | 5 8 0(a) | $15.21 | 679.30 | $23.10 | 700 | $25.33 | 63 |
| Basic bess. pig iron | 20.00 | 5 1 6(a) | ..... | ..... | ..... | ... | 27.94 | (b)69.50 |
| Furnace coke | 5.76 | 1 9 2 | 5.04 | 225 | 9.24 | 280 | 7.64 | 19 |
| Billets | 33.00 | 8 7 6 | 23.04 | 1,029 | 28.38 | 860 | 38.79 | 96.50 |
| Standard rails | 1.79c | 10 3 0 | 1.41c | 1,405 | 2.06c | 1,375 | 2.38c | 132 |
| Merchant bars | 2.25c | 12 16 0†† | 1.30c | 1,304 | 1.88c | 1,250 | 1.98c | 110 |
| Structural shapes | 2.01c | 11 8 0†† | 1.27c | 1,268 | 1.88c | 1,250 | 1.93c | 107 |
| Plates, †¼-in. or 5 mm | 2.03c | 11 10 6†† | 1.65c | 1,650 | 2.21c | 1,475 | 2.29c | 127 |
| Sheets, black | 2.84c | 16 2 6§ | 1.96c | 1,958‡ | 2.70c | 1,800‡ | 2.59c | 144‡ |
| Sheets, galv., corr., 24 ga. or 0.5 mm | 3.28c | 18 12 6 | 2.85c | 2,850 | 6.00c | 4,000 | 6.66c | 370 |
| Plain wire | 3.17c | 18 0 0 | 2.00c | 2,000 | 3.00c | 2,000 | 3.11c | 173 |
| Bands and strips | 2.38c | 13 11 0†† | 1.44c | 1,444 | 1.95c | 1,300 | 2.29c | 127 |

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations.

# IRON AND STEEL SCRAP PRICES

*Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices*

**HEAVY MELTING STEEL**

| | |
|---|---|
| Birmingham, No. 1. | 16.50-17.00 |
| Bos. dock No. 1 exp. | 16.00-16.50 |
| New Eng. del. No. 1 | 16.50-17.00 |
| Buffalo, No. 1 | 17.50-18.00 |
| Buffalo, No. 2 | 15.50-16.00 |
| Chicago, No. 1 | 16.50-17.00 |
| Chicago, auto. no alloy | 15.50-16.00 |
| Chicago, No. 2 auto | 13.50-14.00 |
| Cincinnati dealers | 14.00-14.50 |
| Cleveland, No. 1 | 17.50-18.00 |
| Cleveland, No. 2 | 16.50-17.00 |
| Detroit, No. 1 | †13.00-13.50 |
| Detroit, No. 2 | †12.00-12.50 |
| Eastern Pa., No. 1 | 18.50-19.00 |
| Eastern Pa., No. 2 | 17.50 |
| Federal, Ill. | 15.00-15.50 |
| Granite City, R. R. | 16.00-16.50 |
| Granite City, No. 2 | 14.50-15.00 |
| Los Angeles, No. 1 | 16.50-17.00 |
| Los Angeles, No. 2 | 15.50-16.00 |
| L. A., No. 1 f.a.s. | 18.50-19.50 |
| L. A., No. 2 f.a.s | 17.50-18.50 |
| N. Y. dock No. 1 exp. | 14.50 |
| Pitts., No. 1 (R. R.) | 19.50-20.00 |
| Pittsburgh, No. 1 | 17.50-18.50 |
| Pittsburgh, No. 2 | 16.50-17.00 |
| St. Louis, R. R. | 16.00-16.50 |
| St. Louis, No. 2 | 14.50-15.00 |
| San Francisco, No. 1 | 16.50-17.00 |
| San Francisco, No. 2 | 15.50-16.00 |
| Seattle, No. 1 | 14.50-15.50 |
| Toronto, dirs., No. 1 | 11.25 |
| Valleys, No. 1 | 18.50-19.00 |

**COMPRESSED SHEETS**

| | |
|---|---|
| Buffalo, new | 15.50-16.00 |
| Chicago, factory | 16.00-16.50 |
| Chicago, dealers | 14.50-15.00 |
| Cincinnati, dealers | 13.50-14.00 |
| Cleveland | 17.00-17.50 |
| Detroit | †14.00-14.50 |
| E. Pa., new mat. | 18.50-19.00 |
| E. Pa., old mat. | 16.00-16.50 |
| Los Angeles | 12.00-12.50 |
| Pittsburgh | 17.50-18.50 |
| St. Louis | 11.50-12.00 |
| San Francisco | 14.00-14.50 |
| Valleys | 18.00-18.50 |

**BUNDLED SHEETS**

| | |
|---|---|
| Buffalo, No. 1 | 15.50-16.00 |
| Buffalo, No. 2 | 13.50-14.00 |
| Cleveland | 13.50-14.00 |
| Pittsburgh | 16.50-17.50 |
| St. Louis | 10.00-10.50 |
| Toronto, dealers | 9.75 |

**SHEET CLIPPINGS, LOOSE**

| | |
|---|---|
| Chicago | 11.00-11.50 |
| Cincinnati dealers | 9.50-10.00 |
| Detroit | †9.50-10.00 |
| St. Louis | 9.50-10.00 |
| Toronto, dealers | 6.75- 7.00 |

**BUSHELING**

| | |
|---|---|
| Birmingham, No. 1 | 14.00 |
| Buffalo, No. 1 | 15.50-16.00 |
| Chicago, No. 1 | 16.00-16.50 |
| Cincin., No. 1, deal | 11.50-12.00 |
| Cincinnati, No. 2 | 5.00- 5.50 |
| Cleveland, No. 2 | 12.00-12.50 |
| Detroit, No. 1, new | †13.00-13.50 |
| Valleys, new, No. 1 | 18.00-18.50 |
| Toronto, dealers | 5.00- 5.50 |

**MACHINE TURNINGS (Long)**

| | |
|---|---|
| Birmingham | 6.00 |
| Buffalo | 11.00-11.50 |
| Chicago | 10.00-10.50 |
| Cincinnati, dealers | 6.50- 7.00 |
| Cleveland, no alloy | 11.00-11.50 |
| Detroit | †7.50- 8.00 |
| Eastern Pa. | 12.50-13.00 |
| Los Angeles | 4.00- 5.00 |
| New York | †7.00- 7.25 |
| Pittsburgh | 13.00-13.50 |
| St. Louis | 7.00- 7.50 |
| San Francisco | 5.00 |
| Toronto, delaers | 6.00- 6.25 |
| Valleys | 12.00-12.50 |

**SHOVELING TURNINGS**

| | |
|---|---|
| Buffalo | 13.50-14.00 |
| Cleveland | 12.00-12.50 |
| Chicago | 10.50-11.00 |
| Chicago, spcl, anal. | 12.50-13.00 |
| Detroit | †10.00-10.50 |
| Pitts., alloy-free | 14.50-15.00 |

**BORINGS AND TURNINGS**
*For Blast Furnace Use*

| | |
|---|---|
| Boston district | †6.00- 6.25 |
| Buffalo | 11.00-11.50 |
| Cincinnati, dealers | 5.00- 5.50 |
| Cleveland | 12.00-12.50 |
| Eastern Pa. | 11.50-12.00 |
| Detroit | †7.50- 8.00 |
| New York | †7.00- 7.50 |
| Pittsburgh | 12.00-12.50 |
| Toronto, dealers | 5.50- 6.00 |

**AXLE TURNINGS**

| | |
|---|---|
| Buffalo | 17.00-17.50 |
| Boston district | †9.50-10.00 |
| Chicago, elec. fur. | 17.00-17.50 |
| East. Pa. elec. fur. | 17.50-18.00 |
| St. Louis | 11.50-12.00 |
| Toronto | 6.00- 6.50 |

**CAST IRON BORINGS**

| | |
|---|---|
| Birmingham | 8.50 |
| Boston dist. chem. | †9.50- 9.75 |
| Buffalo | 11.00-11.50 |
| Chicago | 9.00- 9.50 |
| Cincinnati, dealers | 5.00- 5.50 |
| Cleveland | 12.00-12.50 |
| Detroit | †7.50- 8.00 |
| E. Pa., chemical | 14.50-15.00 |
| New York | †7.00- 7.50 |
| St. Louis | 6.00- 6.50 |
| Toronto, dealers | 5.50- 5.75 |

**RAILROAD SPECIALTIES**

| | |
|---|---|
| Chicago | 20.00-20.50 |

**ANGLE BARS—STEEL**

| | |
|---|---|
| Chicago | 19.00-19.50 |
| St. Louis | 17.50-18.00 |

**SPRINGS**

| | |
|---|---|
| Buffalo | 21.50-22.00 |
| Chicago, coil | 20.00-20.50 |
| Chicago, leaf | 19.50-20.00 |
| Eastern Pa. | 24.00 |
| Pittsburgh | 23.00-23.50 |
| St. Louis | 19.00-19.50 |

**STEEL RAILS, SHORT**

| | |
|---|---|
| Birmingham | 17.50-18.00 |
| Buffalo | 22.00-22.50 |
| Chicago (3 ft.) | 19.50-20.00 |
| Chicago (2 ft.) | 20.00-20.50 |
| Cincinnati, dealers | 20.50-21.00 |
| Detroit | †20.50-21.00 |
| Pitts., 3 ft. and less | 23.00-23.50 |
| St. Louis, 2 ft. & less | 19.75-20.25 |

**STEEL RAILS, SCRAP**

| | |
|---|---|
| Birmingham | 15.50 |
| Boston district | †14.00-14.50 |
| Buffalo | 21.00-21.50 |
| Chicago | 16.75-17.25 |
| Cleveland | 21.00-21.50 |
| Pittsburgh | 21.50-22.00 |
| St. Louis | 16.50-17.00 |
| Seattle | 18.00-18.50 |

**FROGS, SWITCHES**

| | |
|---|---|
| Chicago | 16.50-17.00 |
| St. Louis, cut | 15.50-16.00 |

**ARCH BARS, TRANSOMS**

| | |
|---|---|
| St. Louis | 18.50-19.00 |

**PIPE AND FLUES**

| | |
|---|---|
| Chicago, net | 11.50-12.00 |
| Cincinnati, dealers | 11.00-11.50 |

**RAILROAD GRATE BARS**

| | |
|---|---|
| Buffalo | 12.00-12.50 |
| Chicago, net | 11.00-11.50 |
| Cincinnati, dealers | 9.00- 9.50 |
| Eastern Pa. | 16.00-16.50 |
| New York | †12.00-12.50 |
| St. Louis | 12.00-12.50 |

**RAILROAD WROUGHT**

| | |
|---|---|
| Birmingham | 15.00 |
| Boston district | †9.50-10.00 |
| Eastern Pa., No. 1 | 20.00-20.50 |
| St. Louis, No. 1 | 11.50-12.00 |
| St. Louis, No. 2 | 15.00 15.50 |

**FORGE FLASHINGS**

| | |
|---|---|
| Boston district | †11.75-12.00 |
| Buffalo | 15.50-16.00 |
| Cleveland | 16.50-17.00 |
| Detroit | †12.50-13.00 |
| Pittsburgh | 16.50-17.00 |

**FORGE SCRAP**

| | |
|---|---|
| Boston district | †7.00 |
| Chicago, heavy | 20.50-21.00 |

**LOW PHOSPHORUS**

| | |
|---|---|
| Cleveland, crops | 22.50-23.00 |
| Eastern Pa., crops | 24.00 |
| Pitts., billet, bloom, slab crops | 25.50-26.00 |

**LOW PHOS. PUNCHINGS**

| | |
|---|---|
| Buffalo | 20.00-20.50 |
| Chicago | 20.00-20.50 |
| Cleveland | 19.50-20.00 |
| Eastern Pa. | 23.00-24.00 |
| Pittsburgh | 23.50-24.00 |
| Seattle | 15.00 |
| Detroit | †14.50-15.00 |

**RAILS FOR ROLLING**
*5 feet and over*

| | |
|---|---|
| Birmingham | 17.50 |
| Boston | †15.75-16.00 |
| Chicago | 19.50-20.00 |
| New York | †18.50-19.00 |
| Eastern Pa. | 23.00 |
| St. Louis | 19.25-19.75 |

**STEEL CAR AXLES**

| | |
|---|---|
| Birmingham | 19.00-20.00 |
| Boston district | †16.00-16.50 |
| Chicago, net | 20.50-21.00 |
| Eastern Pa. | -23.00-23.50 |
| St. Louis | 20.75-21.25 |

**LOCOMOTIVE TIRES**

| | |
|---|---|
| Chicago (cut) | 20.00-20.50 |
| St. Louis, No. 1 | 17.00-17.50 |

**SHAFTING**

| | |
|---|---|
| Boston district | †18.50-18.75 |
| New York | †18.00-18.50 |
| Eastern Pa. | 24.00 |
| St. Louis, 1¼-3¾". | 18.50-19.00 |

**CAR WHEELS**

| | |
|---|---|
| Birmingham, iron | 19.00-20.00 |
| Boston dist., iron | †14.50-15.00 |
| Buffalo, steel | 21.50-22.00 |
| Chicago, iron | 17.00-17.50 |
| Chicago, rolled steel | 19.50-20.00 |
| Cincin., iron, deal. | 17.00-17.50 |
| Eastern Pa., iron | 20.00-20.50 |
| Eastern Pa., steel | 23.00-23.50 |
| Pittsburgh, iron | 21.00-21.50 |
| Pittsburgh, steel | 23.00-23.50 |
| St. Louis, iron | 18.25-18.75 |
| St. Louis, steel | 19.00-19.50 |

**NO. 1 CAST SCRAP**

| | |
|---|---|
| Birmingham | 16.00 |
| Boston, No. 1 mach. | †15.25-15.75 |
| N. Eng. del. No. 2 | 17.00-17.50 |
| N. Eng. del. textile | 18.25-18.75 |
| Buffalo, cupola | 17.50-18.00 |
| Buffalo, mach. | 18.00-18.50 |
| Chicago, agri. net | 14.00-14.50 |
| Chicago, auto net | 15.00-15.50 |
| Chicago, railroad net | 14.50-15.00 |
| Chicago, mach. net | 15.00-15.50 |
| Cincin., mach. deal. | 16.50-17.00 |
| Cleveland, mach. | 20.00-21.00 |
| Detroit, cupola, net | †14.50-15.00 |
| Eastern Pa., cupola | 20.50-21.00 |
| E. Pa., mixed yard | 17.00-17.50 |
| Los Angeles | 15.50-16.00 |
| Pittsburgh, cupola | 19.50-20.00 |
| San Francisco | 15.50-16.00 |
| Seattle | 16.00-16.50 |
| St. Louis, breakable | 15.00-15.50 |
| St. Louis agri. mach. | 17.75-18.25 |
| St. L., No. 1 mach. | 18.25-18.75 |
| San Francisco | 16.00-17.00 |
| Toronto, No. 1, mach., net, dealers | 16.00 |

**HEAVY CAST**

| | |
|---|---|
| Boston dist. break. | †13.00-13.25 |
| New England, del. | 15.50-16.00 |
| Buffalo, break | 15.00-15.50 |
| Cleveland, break, net | 15.25-15.75 |
| Detroit, auto net | †15.50-16.00 |
| Detroit, break | †11.50-12.00 |
| Eastern Pa. | 18.50-19.00 |
| Los Ang., auto, net. | 14.50 |
| New York break | †14.50-15.00 |
| Pittsburgh, break | 16.00-16.50 |

**STOVE PLATE**

| | |
|---|---|
| Birmingham | 11.00 |
| Boston district | †12.50 |
| Buffalo | 13.50-14.00 |
| Chicago, net | 10.50-11.00 |
| Cincinnati, dealers | 9.00- 9.50 |
| Detroit, net | †9.00- 9.50 |
| Eastern Pa. | 16.00-16.50 |
| New York, fdy. | 13.00 |
| St. Louis | 11.00-11.50 |
| Toronto dealers, net | 11.00-11.50 |

**MALLEABLE**

| | |
|---|---|
| Birmingham, R. R. | 17.50 |
| New England, del. | 20.00-21.00 |
| Buffalo | 19.50-20.00 |
| Chicago, R. R. | 19.00-19.50 |
| Cincin., agri., deal. | 14.00-14.50 |
| Cleveland, rail | 22.50-23.00 |
| Eastern Pa., R. R. | 21.50-22.00 |
| Los Angeles | 12.50 |
| Pittsburgh, rail | 20.50-21.00 |
| St. Louis, R. R. | 17.50-18.00 |

## Ores

**Lake Superior Iron Ore**

*Gross ton, 51½ %*
*Lower Lake Ports*

| | |
|---|---|
| Old range bessemer | $5.25 |
| Mesabi nonbessemer | 4.95 |
| High phosphorus | 4.85 |
| Mesabi bessemer | 5.10 |
| Old range nonbessemer | 5.10 |

**Eastern Local Ore**

*Cents, unit, del. E. Pa.*

| | |
|---|---|
| Foundry and basic 56-63%, contract. | 9.00-10.00 |

**Foreign Ore**
**(Prices nominal)**

*Cents per unit, c.i.f. Atlantic*

| | |
|---|---|
| Manganiferous ore, 45-55% Fe., 6-10% Mn. | 14.00-15.00 |
| North African low phos. | 14.00 |
| Spanish, No. African basic, 50 to 60% | 14.00 |
| Chinese wolframite, short ton unit, duty paid | $23.75-25.00 |
| Scheelite, imp. | $25.00-26.00 |
| Newfoundland fdry. 55% | 7.00 |
| Chrome ore, 48% gross ton, c.i.f. | $25.00-26.00 |

**Manganese Ore**
*Including war risk but not duty, cents per unit cargo lots.*

| | |
|---|---|
| Caucasian, 50-52% | 50.00-51.00 |
| So. African, 50-52% | 50.00-51.00 |
| Indian, 49-50% | nom |
| Brazilian, 48-52% | 50.00 |
| Cuban, 50-51%, duty free | 61.20 |

**Molybdenum**

| | |
|---|---|
| Sulphide conc., per lb., Mo. cont., mines | $0.75 |

*—The Market Week—*

# Sheets, Strip

**Sheet & Strip Prices, Page 84, 85**

**Pittsburgh**—Sheet production is steady, all available mills operating to the limit of steel supplies. Orders are off slightly, current volume representing probably a 75 per cent operating rate. However, deliveries are improved somewhat. Automobile companies still are pressing for shipment. Recent price revisions have had little effect on the market. Inventory taxes in some states have caused a decrease in releases.

**Cleveland** — Deliveries on some grades of sheets and strip extend into February, and in the case of certain specialties through next quarter. On the other hand, galvanized sheet producers who refrained from loading books in anticipation of higher prices now have open spots in early schedules. Orders are moderately behind shipments.

**Chicago**—Heavy shipments of flat-rolled steel are supported by extensive needs of the automotive, farm equipment, household appliance, electrical equipment and drum manufacturing industries. New buying remains fairly active, but has tended downward following previous extensive coverage.

**Boston** — Orders for narrow cold strip have declined further and pressure for deliveries has eased, although releases are still substantial. Backlogs are large and some orders for deferred shipment indicate rerolling operations next quarter will be close to the high mark of recent weeks. Consumption appears to be holding. The fact cold strip prices did not advance in line with the $2 increase in hot strip continues to complex smaller independent rerollers.

**Philadelphia**—The trade is watching the new extra schedules on sheets and strip, but so far these have not encountered an adequate test. Deliveries continue extended, but improvement is noted on some sizes and specifications, including cold-rolled. The stove trade is less active, but radio and automotive interests continue busy.

**New York**—Despite a letdown in sheet specifications, resulting partly from the season, pressure for delivery of lighter gage hot-rolled material which cannot be handled by continuous mills continues heavy. Stove makers continue the most active single consuming group, with refrigerator specifications well sustained.

Buying of narrow cold strip is gradually slackening, but shipments are heavy, with no deliveries being


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AS with any equipment, the performance of a roller leveler determines whether or not its purchase is justified. This factor, often hard to evaluate when appropriations are made, is recognized where Ungerer levelers operate.

The Ungerer leveler is designed to flatten sheet and strip *immediately* at any speed, regardless of size, gage, or tensile values.

For this reason, Ungerer leveling has meant *cheaper* as well as better leveling in Ungerer-equipped plants.

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held up. Operations are near capacity and backlogs are sufficient to hold output close to the current rate through first quarter. Consumption shows only scattered letdowns which in most instances are partially seasonal. Incoming business is estimated still close to 70 per cent of capacity, compared with practically 100 per cent several weeks back.

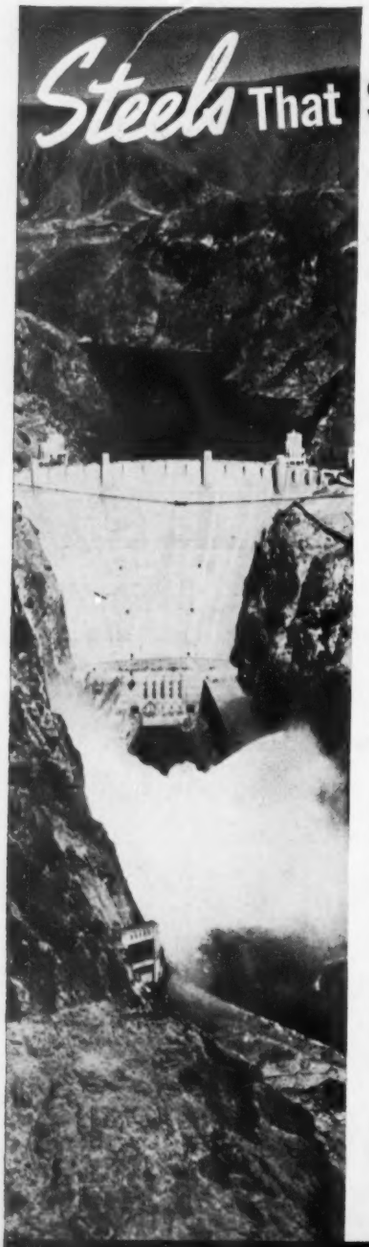
**Buffalo** — Buying has moderated and mills are starting to cut into backlogs. Many consumers still are seeking prompt shipment, but in general pressure for delivery has relaxed. Fairly large backlogs will be carried over into next quarter.

**Birmingham, Ala.** — Sheet and strip production balances shipments. Some headway has been made on backlogs, but indications are that sufficient tonnage will be carried over into the new year to assure steady production through most of the first quarter.

**Toronto, Ont.**—Some war business that has appeared lately includes orders for heavy sheets from Massey-Harris Co., which has received a large contract for mines from the British government. However, steel buying for war needs still is small.

**Cincinnati**—Orders are steady but are below capacity production for the district. Schedules for January are fairly well filled, large tonnages are booked for February and an occasional consumer has asked for delivery position in May and June.

**St. Louis**—Orders have receded further, but specifications are sustained and deliveries have been shortened. Enameling stock is in a tight delivery position, and some large users, including stove makers, are pressing for shipments.

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**Dictated by these requirements, the specifications for his individual steels must be written. Then by specifying Thomastrip he can be sure that the steels will be "his steels"—match the details of his order and perform dependably in his shop practice.**

**Thomastrip has a wide reputation for being faithful to exacting requirements. Produced in a highly modernized mill with many exclusive Thomas Methods, it is processed under scientific control to meet the wide variations in manufacturers' needs.**

**This organization will capably supply you with the particular cold rolled strip steels that will best serve your plant and your customers.**

**Bright Finish Uncoated, and Electro Coated in Nickel, Zinc, Brass, Copper, Bronze, and Tin.**

THE THOMAS STEEL CO.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
WARREN, OHIO


# Plates

**Plate Prices, Page 84**

**Chicago**—Demand continues rather encouraging because of heavy needs of freight car builders and the petroleum industry. Building construction involving plates is lagging.

**Boston** — Buying has slackened, but shipyard and railroad specifications are fairly well maintained. Miscellaneous demand is less active. Boiler and structural shop requirements are disappointing. Deliveries have improved. More tonnage is being placed under 2.35c, base, eastern Pennsylvania, or at 2.10c. Tank work is small and considerable paper mill work expected for some time has not yet developed.

Contract for 11 torpedo boats and 12 submarine chasers, approximating $5,000,000, has been awarded Electric Boat Co., Groton, Conn., by the navy.

**New York**—While 2.35c base can still be done on certain rush plate orders, mills which have been quoting this price are more disposed to meet competition. Scrap prices have eased and demand generally is more orderly. However, first quarter policy remains to be announced. Buying is starting to reflect year-end influences, specifications from car builders being outstanding. Little new car work is being figured. Heavier releases from shipyards are seen next quarter.

New York Central railroad takes bids Dec. 29 on first quarter requirements of plates and other steel products.

**Philadelphia**—Some plate makers still are obtaining 2.35c base on material for prompt delivery. Whether this price will be extended into first quarter depends on that period's business. Larger interests have comfortable backlogs extending at least through mid-February, but nevertheless are able to ship some

items when necessary in two weeks. Light export business is reported.

**Birmingham, Ala.** — Railroads and tank fabricators continue major sources of demand for plates. While there has been some tapering in demand, sufficient tonnage still is available to keep orders about even with production, thus easing pressure for shipment.

**Seattle** — Pending tonnages are small. Shops report normal seasonal run of repair work, involving small quantities of plates. Puget Sound Machinery Depot, Seattle, is low at $41,500 to United States engineer, Bonneville, for a steel caisson, involving 200 tons. Seattle opened bids Dec. 15 for 642 feet of ¼-inch thickness, 30-inch steel welded water pipe.

**San Francisco** — Little improvement is noted in plate demand and most inquiries continue in lots of less than 100 tons. Awards totaled 830 tons, bringing the aggregate to date to 91,506 tons, compared with 45,157 tons for the same period a year ago.

## Plate Contracts Placed

5900 tons, car floats and lighters, Pennsylvania railroad, for Port of New York, to Dravo Corp., Pittsburgh, and Sullivan Dry Dock Co., New York.

400 tons, two oil tanks, 140-foot diameter, 21 feet high, Alhambra, Calif., to Southwest Welding & Mfg. Co., Alhambra, Calif.

155 tons, two silos, National Lead Co., Brooklyn, to Chicago Bridge & Iron Co., Chicago.

120 tons, 200,000-gallon tank and tower, 100-feet high, naval air base, Alameda, Calif., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

## Plate Contracts Pending

200 tons, caisson for United States engineer, Bonneville, Oreg.; Puget Sound Machinery Depot, Seattle, low.

# Bars

**Bar Prices, Page 84**

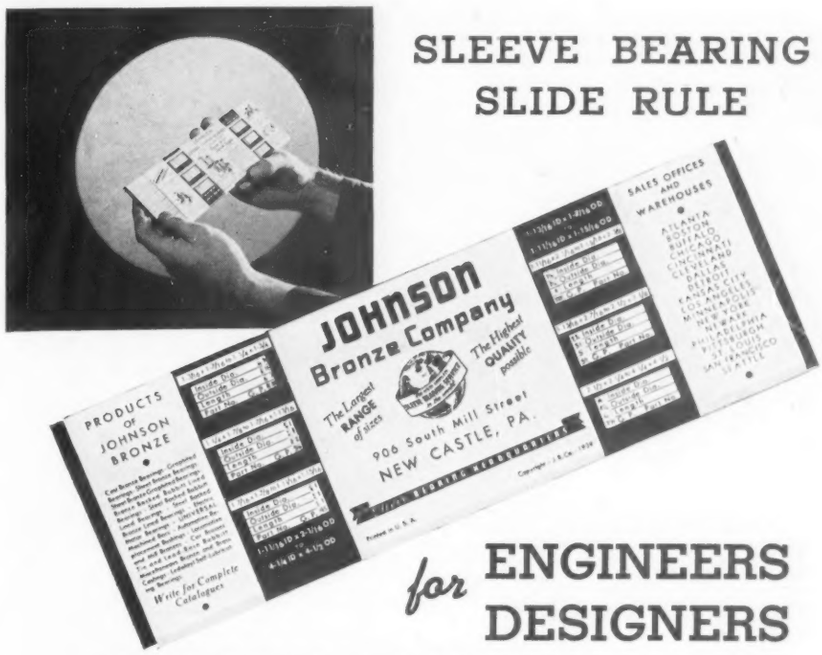
**Cleveland** — Despite continued heavy demand for current shipment, bar producers will end the year with large backlogs. Deliveries generally extend into February. Automotive, machinery and miscellaneous needs comprise the principal support to business.

**Boston** — Although down slightly from the recent peak, bar sales continue active and well diversified. Most tonnage is moving through jobbers who are specifying in good volume. Machine tool, shipyard, railroad, small tool, bolt and nut specialties, screw machine products and miscellaneous industrial requirements are well maintained. Chain and government shop needs are also substantial. Deliveries have improved, but some sizes and grades are still somewhat extended.

**Chicago**—Bar sales show a gradual decline in orders. Releases, however, continue fairly well in line with production. Tractor builders are taking substantial tonnages. An increase in buying and releases for railroad freight car construction is expected in January. Most consumers are well covered for first quarter, and no substantial buying is thought likely before February.

**New York**—Bar specifications are widely scattered, coming principally from machine tool builders, railroads and railroad equipment manufacturers. Government releases are heavy, and demand from shipyards is steady. Despite some letup demand is better sustained than in most other major products.

**Philadelphia**—Bar deliveries average six to eight weeks, depending on the size. Some smaller mills are naming earlier dates. Consumption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*Sleeve* BEARING HEADQUARTERS
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is heavy, as indicated by the sustained movement through warehouses.

# Pipe

Pipe Prices, Page 85

**Pittsburgh**—Business is off slightly, although demand for standard pipe and mechanical tubing is steady. Backlogs extend six weeks in many products. Demand for oil country material has changed little, with line pipe sales relatively small. Pressure tubing for railroad use is active.

**Chicago** — Cast pipe demand is chiefly in small lots, although several orders of about 100 tons have been placed or are pending. Prospects for spring are considered rather good, including an expected increase in WPA requirements.

**Boston** — Cast pipe buying has eased materially and pressure for deliveries slackened, although municipalities having blanket orders bought heavier than expected. Utilities are buying little. Small-diameter steel pipe is moving steadily in small lots, but demand is not brisk and resellers have no difficulty keeping stocks well balanced. Plumbing supply houses are best purchasers. Wrought iron pipe moves slowly.

**New York**—Cast pipe buying is slower. New York city is expected to purchase close to 2000 tons early next year, but the bulk of recent purchases have been for small miscellaneous lots. An exception is West Hartford, Conn., approximately 500 tons for that city going to United States Pipe & Foundry Co., Burlington, N. J. Panama has bought substantial tonnages in several contracts with the same foundry. Inquiries from Central and South America are numerous, buyers being unable to get pipe from Europe.

About 5000 tons of 14, 18 and 20-inch steel pipe, seamless or electrically welded, will be required for piling for the Queens approach to the midtown tunnel. General contractors' bids close Dec. 20.

**San Francisco**—No improvement in demand for cast iron pipe is noted and many municipalities continue to expect aid from federal sources for extending existing water systems. Awards, so far this year aggregate 35,701 tons as compared with 30,660 tons for the corresponding period in 1938.

## Cast Pipe Placed

121 tons, water line extension, Grand Chute, Wis., to James B. Clow & Sons Co., Chicago.

100 tons, waterworks, Jackson, Mich., to Alabama Pipe Co., Birmingham, Ala.

100 tons, miscellaneous pipe and fittings, north side sewage treatment plant, Chicago, to Glamorgan Pipe & Foundry Co., Lynchburg, Va.

## Cast Pipe Pending

132 tons, city water works, Jackson, Mich., bids in Dec. 12.

115 tons, subway section requirements, Chicago.

114 tons, water works, Prentice, Wis.

## Steel Pipe Placed

Unstated, various sizes totaling $101,195 for United States navy to Consolidated Supply Co., Portland, Oreg.

# Wire

Wire Prices, Page 85

**Pittsburgh**—Merchant wire orders have dropped slightly, principally because of year-end factors. Delivery difficulties still are encountered on some products, including wire nails. Shipments of manufacturers' wire are steady, with buying also lighter. Backlogs are fairly heavy,

*As Dependable*

AS A LIGHTHOUSE

BEACON!

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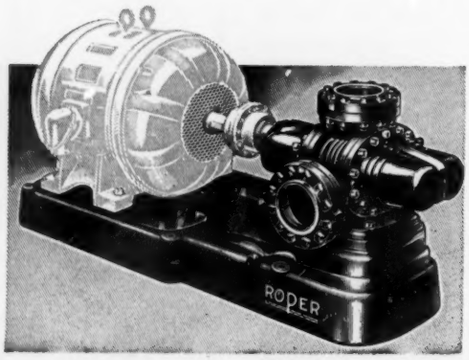


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with a large part of first quarter capacity already absorbed.

**Boston** — Bookings of wire products are slackening and pressure for deliveries has eased, with some consumers deferring shipment. Specifications still are heavy, and finishing operations in most departments are near capacity. Backlogs assure almost full operations next quarter. Inventories in consumer hands Jan. 1 will be light as a rule. While producers of rods are well sold ahead, the tight situation prevailing in recent weeks is somewhat relieved.

**New York**—Wire shipments are well above incoming business which is estimated at 65-70 per cent of capacity. Considering heavy buying of recent weeks this rate of bookings is considered satisfactory. Producers have welcomed the breather and are concentrating on delivering all tonnage possible before Jan. 1. Some tonnage, however, will go over, especially fine wires and specialties requiring longer periods of processing. Deliveries on the more common wire products are beginning to improve.

# Rails, Cars

**Track Material Prices, Page 85**

Railroad buying apparently is at an end for this year, although a few small inquiries are pending. New York Central has been given approval by interstate commerce commission for issuance of $9,000,000 equipment trust certificates to RFC for financing 4000 freight cars and five diesel switchers. The road agrees to spend $3,600,000 for repairs by Oct. 1, 1940.

Pacific Fruit Express Co., subsidiary of Union Pacific and Southern Pacific, has awarded 3750 tons of steel, mostly structurals for rebuilding 2500 refrigerator cars in its own shops. The steel was distributed among a number of suppliers.

# Tin Plate

**Tin Plate Prices, Page 84**

Tin mill operations have been curtailed to 92 per cent, largely the result of year-end inventory factors. Some producers are unable to store larger quantities of plate which is held for release after Jan. 1. In many cases consumers will enter 1940 with large inventories, although certain of the larger users have managed to keep stocks in line with current needs. Reaffirmation of prices also has been a factor in relaxing pressure for December shipment. Export inquiries are heavier, with a peak in such business not looked for until well after the first of next year.

# Shapes

**Structural Shape Prices, Page 84**

**Pittsburgh** — Inquiries continue sufficient to maintain a fairly good outlook, with awards retarded somewhat by the season. Inquiries are swelled by work in connection with national defense, although private jobs are numerous and demand as a whole is well balanced.

**Cleveland**—Relatively quiet demand is giving structural shape producers an opportunity to add to stocks which were reduced during the fall bulge in shipments. Early delivery is available on most sizes. Fabricated shape awards and inquiries generally are small.

**Chicago** — Shape specifications have declined further, but inquiries for fabricated material are more numerous. Pending business includes 1500 tons for a Denver hangar and

● We do not claim that Link-Belt Twin Disc clutches never require servicing—all mechanical equipment does. But with Link-Belt Twin Disc clutches, servicing is reduced to a minimum. The reason is simple: Link-Belt Twin Disc clutches are engineered to fit their jobs—not merely to fit machines. That makes a lot of difference in the amount of service required—and in performance too.

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1200 tons for a bridge here on which bids have been opened.

**Boston** — Structural contracts, confined to small lots, are estimated around 500 tons, including a housing project, South Boston. Bulk of buying and inquiry is now mostly for private work. Bridges active in Massachusetts and Vermont are estimated at 1000 tons, mostly small stringer spans with the exception of a 475-ton deck truss structure at Huntington, Mass.

**New York**—Not for a long time has structural steel inquiry been so light in the New York metropolitan area. For bridges, mostly small, 2000 tons pend for New York and New Jersey. Largest private project pending is a laboratory building, Bell Laboratories Inc., Murray Hill, N. J., taking 3000 tons if the project goes structural steel, although an alternate on reinforced concrete is under consideration.

**Philadelphia**—The navy takes bids Dec. 20 on 9800 tons of piling, including 7880 tons of H-piles, 1820 tons of sheet piling and 100 tons of accessories for two drydocks, Pearl Harbor, Hawaii. Virginia Bridge and Bethlehem Steel companies are reported low on seven hangars for the east coast. Private work is quiet. A district fabricating shop has a six-week backlog.

**San Francisco** — The outlook is exceptionally bright, with more than 41,000 tons now up for figures or pending. Awards aggregated 7898 tons and brought the total to date to 158,529 tons, compared with 159,474 tons for the corresponding period in 1938.

**Washington** — Bidding for the entire work, Virginia Bridge Co. appears low for the construction of nine navy hangars, taking close to 9000 tons of shapes, to be built in widely scattered sections of the country. Alternates were taken on one or more units, and total of such low bids is under the figure quoted by Virginia Bridge. For two in New England and one at Brooklyn Bethlehem Steel Co. is low.

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## Shape Contracts Placed

10,175 tons, copper refining plant, Phelps-Dodge Corp., Morenci, Ariz., to Kansas City Structural Steel Co., Kansas City, Kans.

3750 tons, rebuilding 2500 refrigerator cars, Pacific Fruit Express Co., San Francisco, to various interests.

1800 tons, fabricated H-piling, berths 11 and 12, Brooklyn navy yard, to Carnegie-Illinois Steel Corp., Pittsburgh, through Foley Bros. Inc., New York, contractor.

1100 tons, dumping platforms and ramps, department of sanitation, New York, to American Bridge Co., Pittsburgh, through P. T. Cox Contracting Co., New York, contractor.

800 tons, army warehouses, Hickam Field, T. H., to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.

515 tons, addition, assembly building, General Motors Corp., Linden, N. J., to Whitehead & Kales Co., Detroit.

500 tons, sheet piling, yacht basin, Washington, to Bethlehem Steel Co., Bethlehem, Pa., through A. M. Hazel, New York, contractor.

500 tons, addition, Elco Boat Co., Bayonne, N. J., to Austin Co., Cleveland; also 100 tons, bars.

475 tons, highway bridge FAS-29-B, Copiah-Simpson counties, Mississippi, to Nashville Bridge Co., Nashville, Tenn.

450 tons, garage, North Shore Bus Co., Jamaica, N. Y., to Jones & Laughlin

## Shape Awards Compared

| | Tons |
|---|---|
| **Week ended Dec. 17** | **25,806** |
| **Week ended Dec. 9** | **9,721** |
| **Week ended Dec. 2** | **23,911** |
| **This week, 1938** | **35,970** |
| **Weekly average, year, 1938** | **21,568** |
| **Weekly average, 1939** | **22,547** |
| **Weekly average, November** | **23,003** |
| **Total to date, 1938** | **1,053,454** |
| **Total to date, 1939** | **1,127,341** |

Includes awards of 100 tons or more.

Steel Corp., Pittsburgh.

420 tons, bridge SP-6007, St. Mary parish, Louisiana, to Nashville Bridge Co., Nashville, Tenn.

415 tons, Woolworth store, Louisville, Ky., to Bedford Foundry & Machine Co., Bedford, Ind.

410 tons, warehouse buildings, American Maize Products Co., Hammond, Ind., to United Boiler Heating & Foundry Co., Hammond.

360 tons, H columns, Salinas River bridge, Monterey county, Calif., for state, to Columbia Steel Co., San Francisco.

350 tons, addition, Trommer brewery, New York, to Oltmer Iron Works, Jersey City, N. J.

350 tons, state highway bridge, Crystal Lake, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

340 tons, building, Mead Johnson & Co., Evansville, Ind., to International Steel Co., Evansville.

300 tons plus, navy hangar and base buildings, Tongue Point, Oreg., to Willamette Iron & Steel Corp., Portland, Oreg.; H. J. Settergren, Portland, general contractor.

250 tons, Florida state bridge over Shell creek, Cleveland, Fla., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, post office, Hammond, Ind., to Joseph T. Ryerson & Son Inc., Chicago.

210 tons, repairs, Thirty-first street bridge, Pittsburgh, to Fort Pitt Bridge Works, Pittsburgh.

200 tons, hangar and office building, Minneapolis, for city, to Minneapolis-Moline Power Implement Co., Minneapolis.

187 tons, steel sheet piling, United States engineer, Providence, R. I., to Bethlehem Steel Co., Bethlehem, Pa., pro. 168, bids Dec. 1.

165 tons, apartment house, for Caste Bros., Mt. Lebanon, Pa., to South Hills Ornamental Iron Co., Pittsburgh.

165 tons, grade elimination bridge, Kenton, O., for state, to Burger Iron Co., Akron, O.

149 tons, truss bridge and two I-beam spans, Jamaica-Wardsboro, Vt., to American Bridge Co., Pittsburgh, (89 tons) and I-beam bridge, Chester, Vt., to Bethlehem Steel Co., Bethlehem, Pa., (60 tons) William E. Dailey, North Bennington, Vt. ($18,918.25) and William H. Morse, Bennington, Vt., ($15,416.55) general contractors respectively.

130 tons, bridge FAP-22 (8), Lafayette county, Arkansas, to Clinton Bridge Works, Clinton. Iowa.

125 tons, bridge FAP-592-B (1), Dallas county, Texas, to The Beaird Corp, Shreveport, La.

125 tons, Outer Mission high school addition, San Francisco, to Western Iron Works, San Francisco.

115 tons, alterations to ferry terminal, New York for treasury department to Schacht Steel Construction Inc. New York.

115 tons, foundry addition, Wright Aeronautical Corp., Paterson, N. J., to Republic Steel Corp., Cleveland.

110 tons, housing project, South Boston, Mass., to West End Iron Works, Cambridge, Mass.

100 tons, building, Kraft Phenix Cheese Corp., Philadelphia, to Belmont Iron Works, Eddystone, Pa.

100 tons, bridge FAP-279-D (1) Franklin county, Missouri, to Stupp Bros. Bridge & Iron Works, St. Louis.

100 tons, Oxford branch building, Southern California Telephone Co., Beverly Hills, Calif., to Columbia Steel Co.

100 tons, four oil derricks, one each for General Petroleum Corp., Jackson Exploration Co., Bond Petroleum Corp. and Edison Building Co., Long Beach, Calif., to unstated interests.

100 tons or more, addition, post office, Greenwood, Ga., to Carolina Steel & Iron Co., Greensboro, N. C.

## Shape Contracts Pending

13,000 tons, superstructure, Queens approach, midtown tunnel, New York; bids early next year.

2900 tons, bearing and sheet steel piling, Sepulveda dam, Los Angeles; bids by United States engineer office, Los Angeles, postponed from Dec. 14 to Dec. 21.

2900 tons, laboratory building, for Bell Telephone Laboratories Inc., Murray Hill, N. J.

2400 tons, operations hangar, Rantoul, Ill., for United States army.

1660 tons, bridge near Redding, Shasta county, Calif., for the state; American Bridge Co., Pittsburgh, low.

1500 tons, state hospital building, Kings Park, N. Y.; new bids Dec. 20, direct on steel.

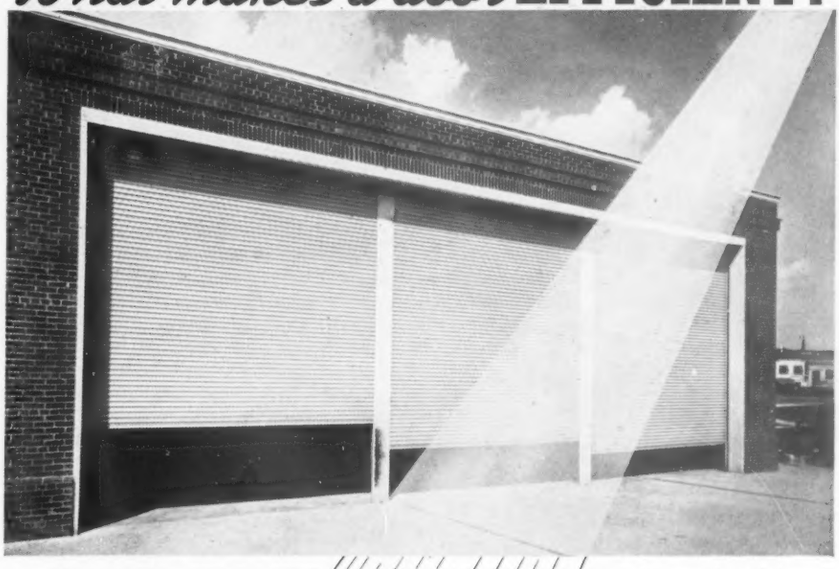
1500 tons, airplane hangar, United States quartermaster corps, Lowry Field, Denver, Colo.; bids Jan. 3.

1200 tons, state bridge, Seventy-ninth street and Kedzie avenue, Chicago; American Bridge Co., Chicago, low.

850 tons, state bridge over Cheyenne river, Wasta, S. Dak.

707 tons, including 187 tons of piling, bridge over Smith river, near Crescent City, Del Norte county, Calif., for the


*What makes a door* **EFFICIENT?**



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Factories: Columbus, Ohio; San Francisco, Calif.

state; bids Jan. 3.

700 tons, naval ammunition magazines, Hawthorne, Nev., for bureau of yards and docks.

500 tons, steel deck truss bridge, Huntington, Mass.; bids Dec. 26, department of public works, state, R. W. Coburn, Boston, chief engineer.

485 tons, highway bridge RC-4091, Cornwall, N. Y.; bids Dec. 28, Albany.

450 tons, alterations to plant, Highland Park, Mich., for Ford Motor Co.

450 tons, 616-foot state viaduct, Tillamook county, Oregon; McNutt Bros., Eugene, Oreg., low.

450 tons, public school 114, New York.

400 tons, state bridge RC-2590, Erie county, New York.

400 tons, overpass, Frankford township, New Jersey, for state.

400 tons, roof for flue, for Anaconda Copper Mining Co., Anaconda, Mont.

350 tons, grade crossing elimination, project RC-4080, Erie county, New York; bids Dec. 28, Albany.

350 tons, steel sheet piling, contract 4, Coney Island sewage disposal plant, New York; bids Dec. 27.

300 tons, movable traffic separators, Chicago.

299 tons, including 150 tons piling, viaduct near Los Gatos, Santa Clara county, Calif., for state; bids Dec. 27.

275 tons, fuse loading plant, naval magazine, Bellevue, D. C., for bureau of yards and docks.

266 tons, bridge in Pacific avenue across Balona Creek, Los Angeles; American Bridge Co., Pittsburgh, low.

265 tons, addition to federal building, Milwaukee.

200 tons, bakery building, Malden, Mass.

200 tons, state bridge, Orange, Mass.

200 tons, Bradford county home, West Burlington, Pa.

200 tons, towers, for International Parachuting Co., New York.

200 tons, bridge, Massachusetts avenue, Washington, for District of Columbia.

200 tons, underpass, Kimball, Neb.; bids Dec. 15

200 tons, overpass, Galloway township, New Jersey, for state.

180 tons, state bridge 1873, Cedarville, Ind.

175 tons, addition to building, for Bell Telephone Co., Dormont, Pa.

160 tons, state undercrossing, Factoria, Wash.; bids to Olympia, Dec. 27.

150 tons, grade separation, Archer avenue, Chicago; Bethlehem Steel Co., Bethlehem, Pa., low.

150 tons, tin plant, for Phelps Dodge Corp., Laurel Hill, N. Y.

150 tons, state highway bridge, Plaistow, N. H.; Middlesex Construction Co., Framingham, Mass., contractor.

150 tons, building S. S. Kresge Co., Philadelphia; bids Dec. 22; also 25 tons reinforcing bars.

140 tons, approaches, state bridge over Raritan river, Woodbridge, N. J.

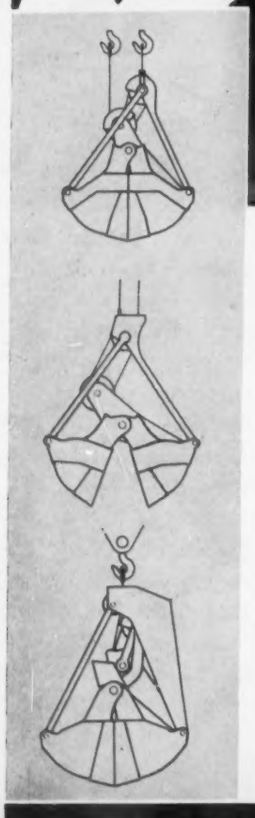
125 tons, Indian Rock dam, York, Pa., for army engineers.

125 tons, addition Williamsport Wire Rope Co., Williamsport, Pa.; bids Dec. 18.

120 tons, state bridge 1876, Scottsburg, Ind.

105 tons, electrically operated steel girder draw bridge, Eel Pond, Woods Hole, Falmouth, Mass; Balcon Construction Co., Boston, low; bids Dec. 12, department of public works, Boston, R. W. Coburn, chief engineer.

100 tons, Astor theater, Philadelphia; bids Dec. 29.



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# Reinforcing

**Reinforcing Bar Prices, Page 85**

**Pittsburgh** — Prices here remain steady, despite reports of weakening on rail steel in the Middle West. In some cases premiums have been paid on jobs requiring immediate delivery. Inquiry is lighter, although shipments have declined less than usual for this season. Pending business remains heavy, but placements are fairly light. Additional mill capacity is being made available for concrete bars.

**Chicago**—The market is quiet, but more work is in prospect for next quarter. Public projects here involve a large tonnage. Several lots of 100 to 200 tons have been placed. Rail steel prices are fairly steady, following recent signs of weakness.

**Boston**—Buying is mostly in small

miscellaneous lots of under 50 tons. Housing projects account for the bulk of pending work, several thousans tons being bid or estimated.

**New York**—With close to 600 tons, mostly mesh for New Jersey state highway work, closing Dec. 29, reinforcing steel inquiry is up somewhat, although current buying is light. A sewage disposal plant, Coney Island, N, Y., takes close to 1500 tons, although in several contracts.

**Philadelphia**—The second unit for the Delaware hospital, Wilmington, Del., will take about 1000 tons of bars, bids Dec. 28. Several smaller jobs are reported.

**Seattle**—While rolling mills have backlogs assuring operation into the new year, new business is lacking and no important projects are up at the moment. Prices are firm and unchanged. Private construction is furnishing only small tonnages.

**San Francisco**—Placements during the week totaled 2322 tons, bringing the aggregate to date to 160,647 tons, compared with 151,627 tons for the same period last year. Pending business exceeds 14,600 tons and calls for 3000 tons for the appraisers store and immigration station at San Francisco, 2096 tons for two drydocks at Pearl Harbor, T. H., and 500 tons for the Ramona housing project, Los Angeles.

## Reinforcing Steel Awards

1600 tons, housing project, Bridgeport, Conn., to Concrete Steel Co., through Morris Bein Co., Chicago, contractor.

565 tons, Salinas River bridge, Monterey county, Calif., for state, to Gilmore Fabricators Inc., San Francisco.

320 tons, Pennsylvania turnpike, Franklin county, to Truscon Steel Co., Youngstown, O.

200 tons, power house, Dresser, Ind., to Bethlehem Steel Co., Bethlehem, Pa.

190 tons, building, American Maize Products Co., Roby, Ind., to Joseph T. Ryerson & Son Inc., Chicago; Campbell-Lowrie-Lautermilch contractors.

188 tons, ventilation building, Laurel Hill tunnel, Westmoreland county, Pennsylvania, to Jones & Laughlin Steel Corp., Pittsburgh; through W. N. Dambach Inc.

177 tons, ventilation building, Sideling Hill tunnel, Fulton county, Pennsylvania, to Jones & Laughlin Steel Corp., Pittsburgh; through W. N. Dambach Inc.

108 tons, stadium superstructure, Lane technical high school, Chicago, to Inland Steel Co., Chicago.

## Concrete Bars Compared

| | Tons |
|---|---|
| **Week ended Dec. 17** | **3,348** |
| **Week ended Dec. 9** | **3,376** |
| **Week ended Dec. 2** | **4,815** |
| **This week, 1938** | **11,539** |
| **Weekly average, year, 1938** | **6,959** |
| **Weekly average, 1939** | **9,331** |
| **Weekly average, November** | **5,806** |
| **Total to date, 1938** | **344,938** |
| **Total to date, 1939** | **466,551** |

Includes awards of 100 tons or more.

## Reinforcing Steel Pending

7500 tons, west substructure, south side filtration plant, Chicago; Michael Pontarelli & Son, Chicago, low on general contract.

3275 tons, Sepulveda dam, Los Angeles; bids postponed from Dec. 14 to Dec. 21.

2096 tons, two drydocks, Pearl Harbor, T. H., specification 9100; bids Dec. 20.

1000 tons, Unit 2, Delaware Hospital, Wilmington, Del., Turner Construction Co., Philadelphia, general contractor; bids Dec. 28.

750 tons, Armistead Gardens housing, Baltimore; John McShain, low.

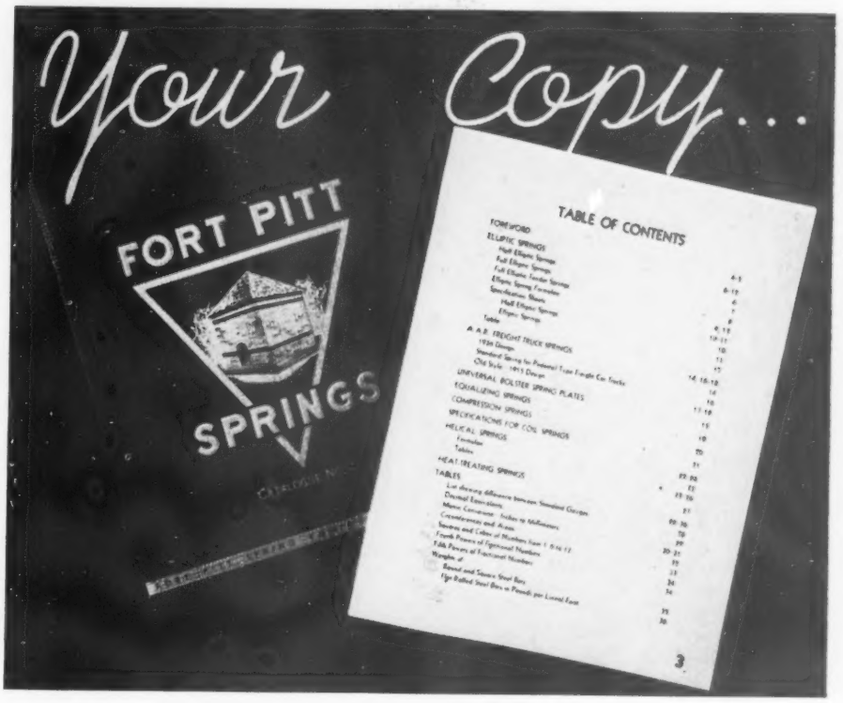
635 tons, bridge near Redding, Shasta county, Calif., for state; United Concrete Pipe Corp., Los Angeles, low on general contract.

550 tons, subway station section D-6B, Chicago; Minder Construction Co., Chicago, low on general contract.

500 tons, Ramona housing project, Los Angeles; C. L. Peck, 233 H. W. Hellman Bldg., Los Angeles, low on general contract at $1,149,000.

460 tons, housing project, Harrison, N. J.; J.A.J. Contracting Co., New York, contractor.

400 tons, subway station section S-9C, [illegible]

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Chicago; bids postponed from Dec. 14 to Jan. 4.

390 tons, Indian Rock dam, York county, Pa., bids Dec. 20, U. S. engineer office.

337 tons, turnpike, sections K4 and B4, Franklin county, Pennsylvania; R. S. Noonan, low.

305 tons, bridge over Smith river, Del Norte county, Calif., for state; bids Jan. 3.

300 tons, highway project, route 6, section 13, Morris county, New Jersey; bids Dec. 29, Trenton.

290 tons, furniture warehouse, Wamkill Realty Co., New York.

270 tons, mostly mesh, highway project, route 4, section 41, Monmouth-Middlesex counties, New Jersey; bids Dec. 29, Trenton; job also takes 50 tons structural steel.

250 tons, invitation 25719, procurement division, U. S. treasury department, Louisville, Ky.; bids Dec. 11.

238 tons, highway bridge RC-4090, Cornwall, N. Y.; bids Dec. 28, Albany, also substantial tonnage highway mesh.

230 tons, industrial laboratory unit and auditorium, department of agriculture, Albany, Calif.; Moore & Roberts, 693 Mission street, San Francisco, low on general contract at $429,900.

225 tons, state highway project 261, Licking county, Ohio; bids Dec. 8.

180 tons, state bridge, Summit, Ill.

175 tons, bridge, Cook county, Illinois, Leninger Construction Co., Chicago, low on general contract.

155 tons, viaduct near Los Gatos, Santa Clara county, Calif., for state; bids Dec. 27.

150 tons, building, Wright Aeronautical Corp., Paterson, N. J.

140 tons, grandstand, Aqueduct race track, New York; Kenny & Finnerty Inc., New York, contractor.

115 tons, bridge, Illinois, Kenny Construction Co., Chicago, low on general contract.

110 tons, bars and shapes, bridges, Milford and Thompson, Conn.; bids Dec. 22, Hartford.

100 tons, or more, addition to state custodial school, Buckley, Wash.; bids to Olympia, Dec. 27.

100 tons, Queens midtown tunnel approach to Gale avenue, Queens, N. Y.; bids Dec. 20.

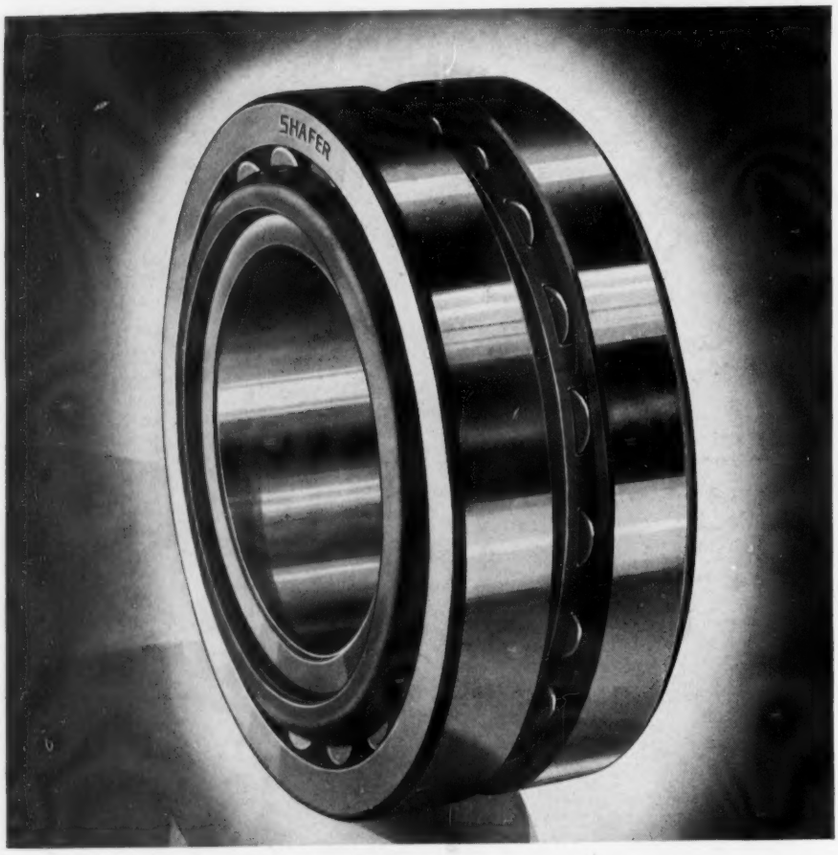
Unstated, two service buildings for Ampere, Wash. power substation; bids to Bonneville Administrator, Portland, Jan. 4.

Unstated, Oregon state arch bridge, Lincoln county; Odom Construction, Co., Oregon City, low.

Unstated tonnage, post office addition, Milwaukee; bids Dec. 19.

Unstated tonnage, hospital, Jacksonville, Ill.; bids Dec. 18.

Unstated tonnage, technical school No. 3, army air corps, Chanute Field, Rantoul, Ill.

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# Pig Iron

**Pig Iron Prices, Page 86**

**Pittsburgh**—Production and shipments remain heavy, despite moderation in orders. The sixth and sole idle stack at Eliza furnaces of Jones & Laughlin Steel Corp. is expected to be lighted this week, giving the district 49 active units out of 57. Sustained shipments are building up some inventories, although most iron is going directly into use. Prices are firm, but talk of an increase early next year has subsided.

**Cleveland** — December shipments are expected to vary little from the levels of the past two months, despite a probable slackening at the year-end. Current deliveries are regulated almost entirely by consumption, since absence of a first quarter price advance removes the incentive to anticipate needs far ahead.

**Chicago** — Shipments continue about 10 per cent ahead of November, but little change is seen for the December total. Foundries are slightly less active and coke shipments reflect this, being off about 12 per cent from last month. Many contracts for $21 iron have been extended into next quarter, but reportedly will be cleaned up as early as possible then.

**Boston** — Buying continues light despite the high foundry melt. Con-

sumers are taking steady shipments against orders, and the bulk of tonnage covered for December will be shipped. Although most foundries have good backlogs of castings orders, few are anticipating iron requirements far in advance. Year-end inventories in most instances will not be overly large, with indications seen of new buying in January.

**New York** — Shipments continue steady, with orders light. This latter applies to foreign as well as domestic demand. Domestic consumers on an average appear to have enough tonnage under contract to last them well into February.

**Philadelphia**—Scattered tonnages for first quarter delivery are being received from consumers who did not fully anticipate requirements. However, most melters are protected well through next period at prices prevailing prior to the last advance. A pipe foundry has taken 1000 tons of southern iron.

**Buffalo**—Deliveries remain heavy although slightly below the recent peak. Some foundries recently working five days a week have curtailed to four days, despite well maintained business. Pig iron production holds at slightly below 80 per cent.

**Cincinnati** — Shipments show no slackening. Considerable unfilled business will be carried over into next quarter, and new business is expected to be light for several weeks. Southern producers have opened books for first quarter, but there has been little covering of future needs.

**Toronto, Ont.**—Sales are off from the average of the past three months, reflecting heavy forward buying in September and only a moderate upturn in the melt since then. Slowness in placing war contracts largely is blamed for listlessness in the market. Little covering for early 1940 has been done. No change in prices next quarter is indicated. Increased imports from the United States may be necessary next year if contracts reach expected volume.

**St. Louis**—Buying is light, except for a few small lots for prompt shipment, but consumption and shipments continue about on a par with November. Jobbing foundries report new busines equal to shipments, permitting a maintenance of backlogs.

**Birmingham, Ala.** — No slackening is noted in pig iron production. Steelworks furnaces are turning out all the iron possible and merchant melters have experienced considerable improvement in shipping instructions.

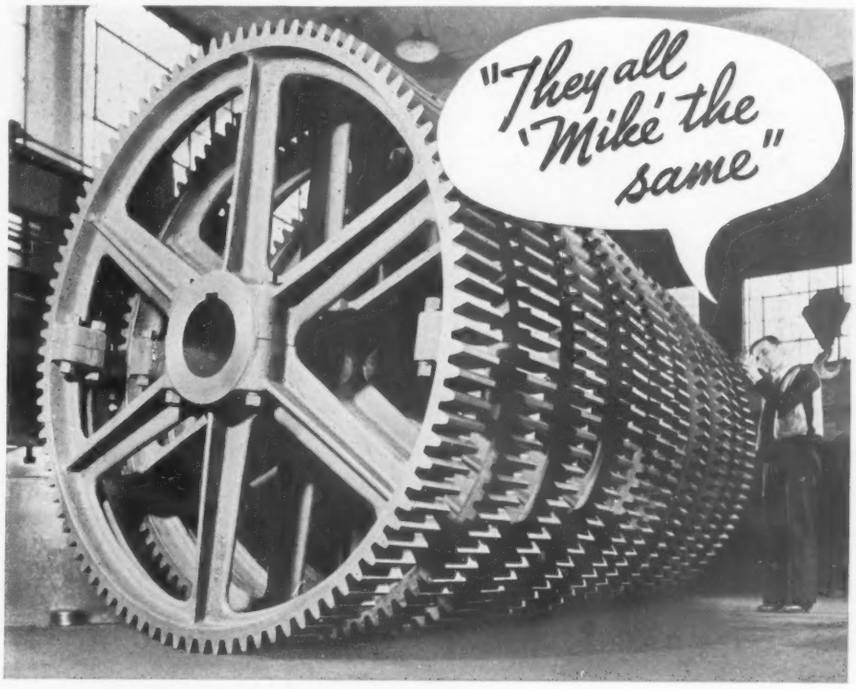
# Scrap

**Scrap Prices, Page 88**

**Cleveland** — Buying is slack, though some consumers have been covering quietly on some steelmaking grades. Desirable scrap is said to be scarce. Prices are steady.

**Pittsburgh**—Opinion is mixed regarding whether or not the market has reached bottom. Broker offerings are below recent quotations, the lowest being around $17.50 for No. 1 steel. Mill sales below $18.50, while reported, cannot be verified, but the range has been reduced $1 since a week ago to $17.50 to $18.50. Quotations on many grades are practically nominal.

**Boston**—Most prices continue to sag. New England foundry buyers are bearish on most grades, notably No. 1 cast, offering $18.50 delivered where freight rates are $2 or more, while dealers generally ask $1 higher. Turnings, several cast grades and busheling for Pennsylvania

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# Behind the Scenes with STEEL

### Newsy Noses

■ Beginning on page 23 this week STEEL carries another of Guy Hubbard's swell articles on machine tools, this time from the standpoint of expansion and modernization planned by the industry. This is also another example of why STEEL is, to quote an ardent reader from Cincinnati, *more newsy, more up-to-date, and more complete* than any of a dozen other business papers that come to his attention. STEEL, of course, doesn't make the news although it once in a while gets blamed for it—but those two dozen editors do seem to have something of a nose for the news and fifty per cent of the material you read in these pages each week is original and exclusive with STEEL.

### Lots of Work

■ For instance, you may think those Business Trend charts are just syndicated things picked up at a dime a dozen but into STEEL's index of metalworking activity and others there goes one whale of a lot of work each week. The other day someone was showing us a 3-column table he was preparing for STEEL and while talking he dropped a roll of adding machine tape which he had used to make up the necessary statistics. The darned thing rolled clear across the room and was at least 20 feet long.

### Don't Blame Us

■ We understand from one of our music-loving circulation peddlers that Cole Porter who wrote *Begin the Beguinne* is writing another song and dedicating it to Stalin—*Finish the Finnish*.

### Did You Know:

■ That the steel industry has 311 working days. Only holidays recognized by the American Iron and Steel institute are Sundays, the Fourth of July and Christmas. We think it might be a pretty fine idea if the steel industry added a 55th annual holiday in permanent recognition of man who probably needs that recognition least of all—February 18, the birthday of Charles M. Schwab.

### Hold Your Hats

■ According to the American Association of Railroads there are 997 daily runs in the United States on which the scheduled speed from start to finish averages 60 miles per hour or more. On 85 runs the average speed is more than 70 miles per hour. As recently as 1928 there wasn't a single train in the country averaging even a mile a minute from start to stop of its run.

### De Luxe

■ Isn't that a beautiful front cover this week? We understand there are more to come.

### Look Who's Here

■ And on page 14 we have a little visitor who seems to be getting around in other people's backyards an awful lot lately, very cleverly getting across the fact that Ben Franklin has no reason to be ashamed of them even after all of these years. Professional greetings to the *Saturday Evening Satevepost*, a nickel's worth if there ever was one.

### Try Again

■ H. A. Woitke of Concrete Steel hopes his Christmas problems are as easy as the long division was last week. 80809 was the answer and everyone submitted the same solution except us. As a mathematician we'd make a good columnist—and yeh, we know, *vice versa*. But if you still want to play, find the cost of making six pieces of chain of five links each into an endless chain of thirty links if it costs 1 cent to open a link and 1 cent to weld it.

SHRDLU



shipment are down 50 cents to $1.50 a ton. Buying for export has slumped materially, with heavy melting steel off $1 a ton.

**Chicago**—Prices were substantially unchanged throughout the week, although for a time an easing in No. 1 steel had been indicated. Reports of trading at less than $16.50 have died out. Indications of more stability as a result of this situation are offset by continued lack of mill interest in the market.

**New York** — Consumers are buying little scrap, and shipments against old orders also are slower. Prices continue to weaken in sympathy with weakness in Pennsylvania market. Lack of shipping still retards export business, with moderate buying continuing against old orders.

**Philadelphia**—Evidence is appearing that prices are reaching a resistance level, but some additional downward adjustments may develop before a turning point is reached. Heavier exports are seen with the arrival of one boat here and four at New York. It is reported Japan has placed a substantial tonnage of No. 2 steel at $17 and No. 1 at $18. Italy is interested in additional purchases. Domestic shipments are slower.

**Buffalo**—Prices are weaker, principally because of easiness in other districts. Buying interest has dried up completely, and quotations on steelmaking grades have been cut an additional 50 cents. This brings No. 1 steel down to $17.50 to $18. Dealers find adequate supplies in covering old orders.

**Detroit**—Absence of buying support has resulted in a general price reduction of 50 cents or more. Prospects are poor for heavier demand the next few weeks. Prices are expected to be more or less nominal until after Jan. 1.

**Cincinnati**—Prices appear pegged for the remainder of the year, with the market undertone stronger. District consumers are taking scrap steadily without inventory additions, but shipments to nearby areas are lighter.

**St. Louis**—Despite further reductions on eight or nine grades, prices appear to have reached bottom. Dealers are unwilling to sell scrap not on hand or available at present prices. Consumption continues heavy, and a number of users are drawing steadily on reserves. Mills and foundries are expected to reenter the market shortly after the holidays.

**Seattle**—Buyers and sellers are playing a waiting game, neither side making offers that will establish prices. Rolling mills have with-

drawn. The situation is weak as foreign buyers are also holding back. No new business from Japan is reported and pending shipments involve old commitments.

Tidewater stocks are being replenished as receipts in the last 60 days have increased materially. Trans-Pacific space is scarce, conference lines holding firm at $10 to $12 freight. For full cargoes, free stevedoring, foreign owners are asking $8, the latest charter on this basis being reported at $7.85.

**Birmingham, Ala.** — While prices are down somewhat from previous weeks, scrap demand remains relatively strong with considerable tonnage going to steelworks.

**Toronto, Ont.**—Dealers have reduced prices another 50 cents on cast scrap. Other grades are firm. Business continues active, although sales to some larger melters are slower. Deliveries to local yards continue heavy. Mills have made no change in bid prices but are closing contracts as far ahead as dealers will permit. Cast supplies are not plentiful despite the recent price reduction.

## Warehouse

**Warehouse Prices, Page 87**

**Pittsburgh**—Business is holding up well, miscellaneous construction work being a contributing factor. Prices are firm. Some delivery problems are encountered, although supplies generally are sufficient.

**Cleveland** — Demand is off from both November and October levels, the letdown being largely seasonal but also reflecting heavier shipments by mills.

**Chicago**—Sales so far this month are unusually well sustained. The trend has been slightly downward but less rapid than seasonal.

**New York**—Bookings are only a trifle under November. Mill deliveries are improving, but distributors are hard put to supply customers with alloys. Warehouses are doing considerable export business, with prospects this will increase, notably with South America.

**Philadelphia**—Business is holding up surprisingly well, so far not being affected by the season. Prices are unchanged, but the galvanized sheet schedule is being scrutinized.

**Buffalo**—While buying has slackened the past few weeks, sales still are considered good. Most prices are expected to be extended into next quarter.

**Cincinnati** — Activity is undiminished. Despite improved mill deliveries, considerable tonnage is going to distributors.

**St. Louis**—Sales are well sustained, open weather favoring demand in rural areas. Oil country goods are moving well to adjacent Illinois fields.

**Seattle** — The jobbing trade is slightly above the seasonal normal, buying for public works being active. Bars, plates and sheets are in best demand.

## Ferroalloys

**Ferroalloy Prices, Page 86**

**New York** — Ferroalloy sellers generally indicate they will increase base prices on chrome alloys Jan. 1. Other changes in these and certain other alloys will include slight adjustments in packaging and grinding costs.

In addition to ferrochrome, chrome briquets and chromium metal, revisions will affect manganese briquets, zirconium alloy, silicomanganese and silicon metal. Small quantities of lump ferromanganese will be increased $3 on ton lots, making the new prices $110. Quantities of less than 200 pounds will be raised $4.50 to $118. Base prices

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*Heavy-Duty* ROLLER BEARINGS

on ferrovanadium, salsifer, ferromanganese in larger quantities, spiegeleisen and various other leading ferroalloys have been reaffirmed.

Under the proposed schedules, ferrochrome of 66-70 per cent, 4-6 per cent carbon, in carlots, freight allowed, will be 11.00c per pound chrome contained; ton lots will be 11.75c and less than ton lots 12.00c.

# Iron Ore

Iron Ore Prices, Page 88

**Cleveland** — A shipment of 6549 tons this month brought the total movement of Lake Superior iron ore from upper lake ports for the 1939 season to 45,072,724 gross tons, according to the Lake Superior Iron Ore association. This compares with 19,263,011 tons in 1938. Since 1930 the 1939 total was exceeded only by the 62,598,836 tons moved in 1937.

Inquiries from Ford Motor Co. for 220,000 tons of iron ore, the first to be received for 1940 delivery, will be bid Dec. 20. The Ford inquiry, usually the first to be issued, is out several months earlier than usual.

**New York** — Foreign iron ore prices are fairly steady, with buying relatively quiet. According to foreign dispatches, Switzerland has resumed shipment of iron ore to Germany from the Valley of Frick, following interruption at the beginning of war.

## Coke Oven By-Products

Coke By-Product Prices, Page 85

**New York**—With the exception of benzol, distillate prices will advance for first quarter. Toluol will be up 3 cents per gallon to 25.00c and solvent naphtha and industrial xylol will advance 1 cent a gallon to 27.00c. Benzol remains unchanged at 16.00c. Releases are heavy and buying is limited only by lack of available supplies despite heavy production. Phenol and naphthalene quotations for first quarter will be unchanged. Buying and specifications are active, notably for the former from industrial customers, the plastic trade especially.

## Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 85

An additional charge of $5 net per item on special sizes of bolts and on special head types of bolts not carried in standard stocks has been announced by a leading producer, effective immediately. This is intended to offset extra costs incurred in production of special sizes.

# Steel in Europe

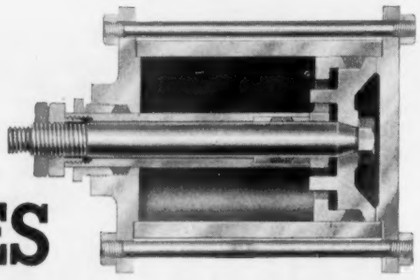
Foreign Steel Prices, Page 87

**London**—(*By Cable*)—Most foreign iron and steel importations into Great Britain now are duty free and commercial users are obtaining larger supplies more easily. Exports also are beginning to expand, with tin plate shipments active and galvanized sheets moving abroad in larger tonnage.

British manufacturers of black and galvanized sheets have been given official permission to fill the remaining two-thirds of all orders booked prior to the outbreak of the war. About a month ago permission was granted for release of one-third of such orders.

Belgium and Luxemburg report considerable export demand, exceeding available tonnage from steelworks.


2 FEATURES



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## Government Iron, Steel Awards Total $827,122

During the week ended Dec. 2, the government purchased $827,121.70 worth of iron and steel products under the Walsh-Healey act as follows: McGill Mfg. Co., Washington, $14,935; New England Structural Co., Everett, Mass., $11,906; Crane Co., Washington, $77,613.55; Pressed Steel Tank Co., West Allis, Wis., $24,876.50; Heintz Mfg. Co., Phialdelphia, $81,011.55; The Steel Improvement & Forge Co., Cleveland, $17,435; Carnegie-Illinois Steel Corp., Washington, $15,280 (estimated); Penn Galvanizing Co., Philadelphia, $24,590 (estimated); American Bridge Co., Pittsburgh, $203,952.02 (estimated); The Weatherhead Co., Cleveland, $16,248.04; The Parker Appliance Co., Cleveland, $10,987.20; Carnegie-Illinois Steel Corp., Boston, Mass., $14,664.71; McGill Mfg. Co., Valparaiso, Ind., $21,860.90; Carnegie-Illinois Steel Corp., Chicago, $41,625.45; Columbia Steel Co., San Francisco, $16,132.25; J. Bishop & Co. Platinum Works, Mavern, Pa., $10,557.97; Geuder, Paeschke & Frey Co., Milwaukee, Wis., $21,600; Hart Mfg. Co., Louisville, Ky., $37,626.50; Kansas City Structural Steel Co., Kansas City, Kans., $12,776.20; Bolt & Nut division, Republic Steel Corp., Cleveland, $17,134.10; The F. A. Klaine

Co., Cincinnati, $14,700; Sheffield Steel Corp., Kansas City, Mo., $12,346.90; The Milton Mfg. Co., Milton, Pa., $10,875.86; Dravo Corp., Pittsburgh, $11,840; and Bethlehem Steel Co., Bethlehem, Pa., $84,546.

# Equipment

**New York** — Moderate slowing down in machine tool buying is attributed to continued extensions in deliveries on practically all lines of shop equipment. Already sold on some units for delivery in late 1940 and in some instances into 1941, builders and dealers are unable to quote definite prices and in many instances are none too willing to take on additional business at this time.

Plenty of foreign volume is available, but terms as to delivery conflict with domestic customer needs and most shops prefer to cover domestic customers first. While there is no definite trend toward higher prices, readjustments from time to time based on costs tend to advance quotations. Government shop buying continues unabated and is actually on the increase. Orders are generally taken with a clause against cancellation.

**Chicago** — Machinery business from railroad shops is expected to be the best next quarter in close to ten years, some selling interests indicate. Railroad budgets for 1940 are said to include an impressive amount of machinery needs, while indications are more will be included in budgets not yet completed. Business has slipped a bit this month, both bookings and inquiries being lower. This is characterized as a seasonal decline. Improvement is seen starting about the middle of January. Sellers have numerous quotations still outstanding, but there has been renewed interest in a number of old inquiries.

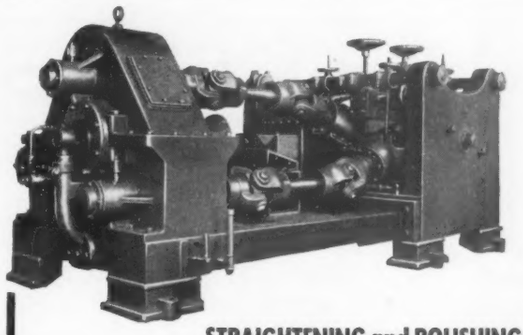
**Seattle**—Public agencies continue to furnish most of the demand, electrical and automotive equipment leading. Denver will open bids Dec. 27 for brass and copper pipe, bronze fittings, etc., for the ice prevention air system at Coulee dam, Spec. 1410-D. Tacoma has called figures Dec. 18 for four transformers, $25,000 available, and Dec. 26 for two single phase transformers. Graybar Electric Co. underbid General Electric Supply Co., Portland, by one cent for furnishing conduits and fittings for the Bonneville power project.

■ Claude S. Gordon Co. Inc., Chicago, has moved its Indianapolis office to larger quarters. W. E. Ellsworth, formerly with the Chicago office, has been named district manager at Indianapolis.

## Nonferrous Metals

**New York**—Tin prices soared in London last week following the removal of all restrictions by the ministry of supply. Reaction in the domestic market was negligible since prices in London rose only to a parity with the New York level. All other major nonferrous metal markets remained steady and quiet.

**Copper**—While all producers continued to quote on the firm 12.50-cent Connecticut basis, resellers and exporters lowered prices to 12.75c for prompt delivery. Sales were moderate early in the week but tapered during the last few days, due in part to easiness on the outside market and to the approach of the year-end inventory period. Brass ingot sellers reduced base

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Buffalo Detroit New York Philadelphia Boston

prices ¾-cent on all grades except No. 1 yellow which eased ½-cent.

**Lead**—A further reduction of 18,000 tons in refined lead stocks is expected to be revealed in the November statistical report, reflecting continued heavy shipments. While this indicates an active rate of consumption, consumers are well covered on immediate needs and are making only moderate new purchases. Undertone of the market remained firm at 5.35c, East St. Louis.

**Zinc**—For the second week one seller offered prime western zinc at 6.00c, East St. Louis, while others officially were quoting ½-cent higher. Transactions even at the lower level were light despite a less-than-seasonal decline in galvanized sheet output to 76 per cent of capacity.

**Tin**—After holding at the maximumprice of £230 for several weeks, standards jumped to around £275 on Monday and then settled to £258 on spot by the weekend. Prices rose sharply also in Singapore and trading in both markets was active. The International committee raised export quotas for the first quarter to 120 per cent of standard tonnages which tended to lessen the effect of the freer trading policy. Straits spot here closed at 50.75c compared with 51.12½c at the end of the previous week. A noteworthy market development was the low bid by American Tin Consolidated, Marquette, Mich., for supplying the navy with 90 long tons of grade "A" tin which would be refined from virgin American ores.

■ Contracts for a 20,000-square foot plant for the Congress Tool & Die Co. at Mt. Elliott avenue and Outer drive and for a 11,000-square foot addition to the Ex-Cell-O Corp. plant at 1200 Oakman boulevard, both in Detroit, have been awarded to the Austin Co., Cleveland.

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## Nonferrous Metal Prices

| Dec. | Copper: Electro, del. Conn. | Copper: Lake, del. Midwest | Copper: Casting, refinery | Straits Tin, New York: Spot | Straits Tin, New York: Futures | Lead N. Y. | Lead East St. L. | Zinc St. L. | Aluminum 99% | Antimony Amer. Spot, N.Y. | Nickel Cathodes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 12.50 | 12.50 | 12.37½ | 51.12½ | 49.00 | 5.50 | 5.35 | 6.00 | 20.00 | 14.00 | 35.00 |
| 11 | 12.50 | 12.50 | 12.37½ | 51.00 | 49.50 | 5.50 | 5.35 | 6.00 | 20.00 | 14.00 | 35.00 |
| 12 | 12.50 | 12.50 | 12.37½ | 51.25 | 49.75 | 5.50 | 5.35 | 6.00 | 20.00 | 14.00 | 35.00 |
| 13 | 12.50 | 12.50 | 12.37½ | 50.75 | 48.50 | 5.50 | 5.35 | 6.00 | 20.00 | 14.00 | 35.00 |
| 14 | 12.50 | 12.50 | 12.37½ | 51.00 | 48.00 | 5.50 | 5.35 | 6.00 | 20.00 | 14.00 | 35.00 |
| 15 | 12.50 | 12.50 | 12.37½ | 50.75 | 47.75 | 5.50 | 5.35 | 6.00 | 20.00 | 14.00 | 35.00 |

*Nominal.

### MILL PRODUCTS

*F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 12.50c Conn. copper*

**Sheets**

| | |
|---|---|
| Yellow brass (high) | 19.31 |
| Copper, hot rolled | 21.12 |
| Lead, cut to jobbers | 8.75 |
| Zinc, 100 lb. base | 11.25 |

**Tubes**

| | |
|---|---|
| High yellow brass | 22.06 |
| Seamless copper | 21.62 |

**Rods**

| | |
|---|---|
| High yellow brass | 15.23 |
| Copper, hot rolled | 17.62 |

**Anodes**

| | |
|---|---|
| Copper, untrimmed | 18.37 |

**Wire**

| | |
|---|---|
| Yellow brass (high) | 19.56 |

### OLD METALS

*Nom. Dealers' Buying Prices*

**No. 1 Composition Red Brass**

| | |
|---|---|
| New York | 8.37½-8.50 |
| Cleveland | 8.75- 9.00 |
| Chicago | 8.75-9.00 |
| St. Louis | 8.25-8.50 |

**Heavy Copper and Wire**

| | |
|---|---|
| New York, No. 1 | 10.00-10.25 |
| Cleveland, No. 1 | 10.00-10.25 |
| Chicago, No. 1 | 10.00-10.25 |
| St. Louis | 9.25-9.75 |

**Composition Brass Turnings**

| | |
|---|---|
| New York | 8.00-8.25 |

**Light Copper**

| | |
|---|---|
| New York | 8.00-8.25 |
| Cleveland | 8.00-8.25 |
| Chicago | 7.87½-8.12½ |
| St. Louis | 7.25-7.50 |

**Light Brass**

| | |
|---|---|
| Cleveland | 4.75-5.00 |
| Chicago | 5.62½-5.87½ |
| St. Louis | 5.00-5.50 |

**Lead**

| | |
|---|---|
| New York | 4.85 |
| Cleveland | 4.37½-4.50 |
| Chicago | 4.25-4.50 |
| St. Louis | 4.00-4.25 |

**Zinc**

| | |
|---|---|
| New York | 3.50-3.75 |
| Cleveland | 3.25-3.50 |
| St. Louis | 3.25-3.50 |

**Aluminum**

| | |
|---|---|
| Mixed, cast, Cleveland | 10.25-10.50 |
| Borings, Cleveland | 7.75-8.00 |
| Clips, soft, Cleveland | 15.75-16.00 |
| Misc. cast, St. Louis | 8.75-9.00 |

### SECONDARY METALS

| | |
|---|---|
| Brass ingot, 85-5-5-5, less carloads | 13.00 |
| Standard No. 12 aluminum | 15.00-15.25 |

# Construction and Enterprise

### Indiana

GOSHEN, IND.—Goshen Ground Rod Mfg. Co., 218 North Main street, has been incorporated with 1000 shares of capital stock by Chester A. Inebnit, Christian L. Grabner and Philip E. Inebnit, to manufacture and sell metal ground rods and other equipment.

INDIANAPOLIS — Local branch of E. A. Kinsey Co., jobber of heavy machine tools and mill supplies, will erect a building at 723-724 North Capitol avenue here, and will move from the present location at 236 South Meridian street.

SOUTH BEND, IND.—Bendix Aviation Co. will install motors and controls, conveyors, electric hoists, regulators and other equipment in connection with expansion and improvements it is making in aviation apparatus manufacturing plants in the next eight months. Appropriation of $2,000,000 has been authorized.

### Connecticut

BRIDGEPORT, CONN.—United Illuminating Co., 128 Temple street, New Haven, Conn., has plans nearing completion for expansion and improvements in steam-electric generating station here. A new 25,000-kilowatt turbogenerator unit, high pressure boilers and auxiliary equipment will be installed. Estimated cost over $2,000,000. Westcott & Mapes, New Haven, consulting engineers.

### Rhode Island

PROVIDENCE, R. I.—Texas Co. plans erection of a 1-story, 40 x 90-foot, brick and steel pump house.

### New Jersey

PATERSON, N. J.—Wright Aeronautical Corp. is erecting a 1-story addition to its aircraft-engine manufacturing works, containing about 300,000 square feet. Cost close to $1,000,000, including installation of electric power equipment.

### Pennsylvania

JOHNSTOWN, PA.—Johnstown Sanitary Dairy Co. will spend approximately $175,000 for erection of new three-story plant and installation of electric power equipment.

### Michigan

GRAND RAPIDS, MICH.—McInerney Spring & Wire Co. will install electric power equipment in new 1-story plant for automobile and other steel spring manufacture.

### Illinois

CHICAGO—Heinemann's Bakeries Inc., 2316 West Foster street, is erecting a new 1-story baking plant, 150 x 200 feet, and will install power equipment, ovens, conveyors and other equipment. Cost over $75,000.

CHICAGO—Commonwealth Edison Co. has asked bids for erection of new addition to Northwest generating station at Roscoe street and California avenue, including alterations to present building. Additional equipment will be installed to increase capacity. Company has also filed plans for extensions to Calumet power substations on East 100th street, with installation of new transformer bank and accessory equipment. Holabird & Root, 333 North Michigan avenue, are architects for first project, and Shaw, Ness & Murphy, 82 East Jackson boulevard, architects for last noted work.

### Alabama

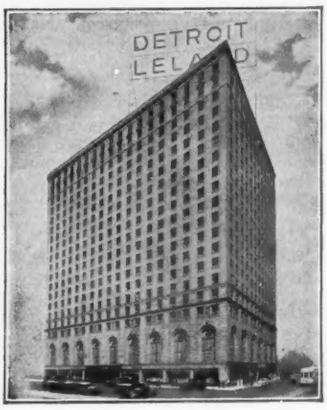
GREENVILLE, ALA.—Butler County Membership Corp., E. H. Wallace, superintendent, has $123,000 REA allotment for 160 miles rural transmission lines in Butler, Lowndes, Dallas and Wilcox counties.

HARTFORD, ALA.—Wiregrass Electric Membership Corp. has been granted $292,000 REA loan for erection of rural transmission lines.

### District of Columbia

WASHINGTON—Office of the general purchasing officer, will open bids at 10:30 a.m., Dec. 22, schedule 3794 for one centrifugal pump, single stage, double suction, volute type with dual drive, capacity 750 gallons per minute at 55-foot head; one drive consisting of a 220-volt, three-phase, 25-cycle electric motor of not more than 15-horsepower, the other drive being a gasoline engine, delivery Panama Canal zone; will open bids Dec. 26, schedule 3782, steel (structural, bar, plate), steel floor plates, steel billets, welded steel pipe, block tin pipe, boiler tubes and coil chain; schedule 3791, one bucket hoisting unit, mounted on 2½-ton truck; Dec. 27, schedule 3786, motor-driven, horizontal, centrifugal pump units; schedule 3793, one portable air compressor. All items are for delivery to Panama Canal Zone, and bids are to be submitted in triplicate.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids until 10 a. m., Dec. 22, schedule 83, two motor-driven, geared head, toolmakers precision lathes, delivery Carderock, Md.; Jan. 2, schedule 73, one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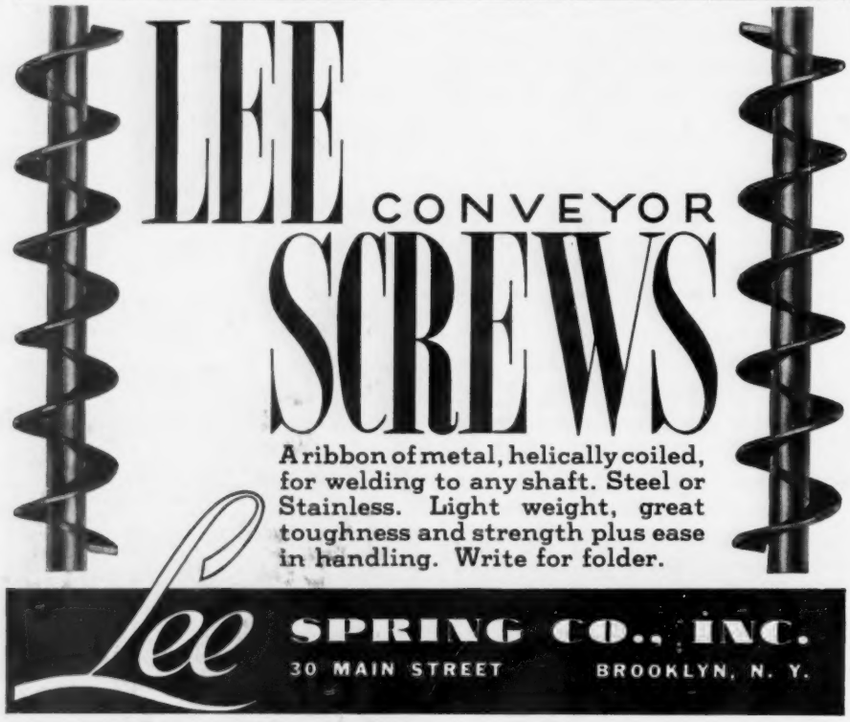
**Die Blocks & Piston Rods**

**NATIONAL FORGE AND ORDNANCE COMPANY**
**IRVINE, WARREN COUNTY, PENNA.**

motor-driven pipe and nipple threading machine, delivery Puget Sound, Wash.; schedule 89, two electric, high frequency steel melting furnaces nose-tilting type, delivery Philadelphia; schedule 56, one motor-driven shear and copper punch, delivery Puget Sound, Wash.; Jan. 5, schedule 38, one motor-driven, geared head, toolmakers, precision lathe; schedule 39, one motor-driven, geared head, 14-inches swing, toolmakers precision lathe; schedule 48, hand operated arbor presses; schedule 49, motor-driven pipe and bolt threading machines; schedule 66, sheet metal working machines; schedule 97, one motor-driven, 36-inch vertical boring machine, all for delivery at Alameda Calif.

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids until 10 a. m., Dec. 22, schedule 50, one motor-driven pipe threading and cutting off machine, delivery Norfolk, Va.; Jan. 2, schedule 70, motor-driven centrifugal pumps, complete with spare parts; schedule 71, three motor-driven, water cooled, three-roll, paint, mill machines; schedule 72, one motor-driven, water cooled, five-roll, paint mill machine; schedule 74, one motor-driven, geared-head, toolmakers' precision lathe; all for delivery at Mare Island, Calif.; Jan. 5, schedule 35, one-motor-driven three-inch drill grinder; schedule 41, one motor-driven, bumping, power, double hammer; schedule 42, four motor spindle, bench type speed lathes; schedule 43, four motor-driven, metal cutting band saws; schedule 44, one motor-driven, single spindle, automatic, high speed screw machine; schedule 45, one motor-driven, carbide tool grinder; schedule 46, two motor-driven bench type, drill grinders; schedule 47, motor driven grinders, all to be delivered at Alameda, Calif.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### Kentucky

BRADENBURG, KY. — Meade county rural electric association, H. Curtis, manager, plans construction of 100 miles rural transmission line in Breckenridge and Meade counties. Will apply for REA grant; project to cost about $120,000. R. W. Chanaberry Inc., 1001-4 Realty building, Louisville, Ky., engineer.

### Georgia

BRUNSWICK, GA.—Brunswick Pulp & Paper Co. will install electric power equipment in connection with expansion and improvements in local sulphate pulp mill. E. J. Gayner, general manager. (Noted Nov. 27).

### Mississippi

PASCAGOULA, MISS.—Jackson County Woolen Mills Inc. is erecting a new addition to its mill, costing $75,000, including installation of electric power equipment. L. C. Winterton, in charge.

### North Carolina

HILLSBORO, N. C.—Piedmont Electric Membership Corp., H. G. Laws, president, has filed application with REA for funds to finance 47 miles rural transmission lines. B. O. Vannort, engineer.

ROCKY MOUNT, N. C.—City, C. F. Chasen, engineer, plans special election on bond issue for construction of sewage disposal plant and incinerator at cost of $300,000.

### South Carolina

CHESTER, S. C.—Springs Cotton Mills Inc., Lancaster, S. C., plans installation of electric power equipment in new addition to branch cotton mill here. Cost about $150,000.

### Tennessee

DAYTON, TENN.—Dayton Veneer & Lumber Co. is rebuilding four warehouses and boiler and power plants. Estimated cost $200,000.

NASHVILLE, TENN.—Aviation Mfg. Corp., 420 Lexington avenue, New York, will install electric power equipment in new aircraft manufacturing plant here, where it has purchased tract of land. A power house will be built. Albert Kahn Inc., New Center building, Detroit, architect and engineer. Estimated cost $1,000,000.

### Louisiana

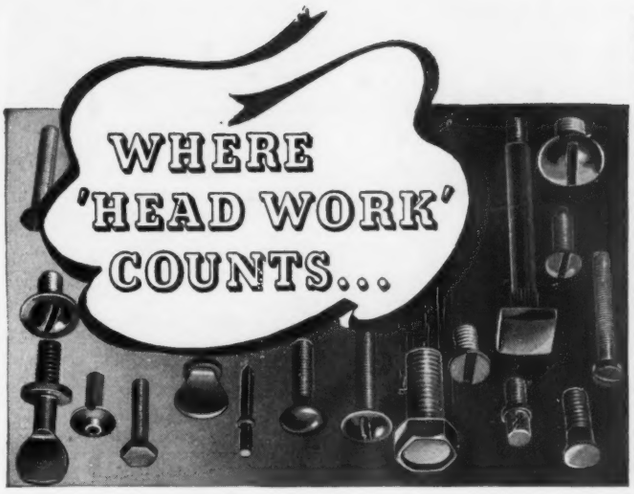
BATON ROUGE, LA.—Ethyl Gasoline Corp., 405 Lexington avenue, New York, will install power equipment in connection with expansion and improvements in branch plant here. (Noted Nov. 27).

### Oklahoma

OKLAHOMA CITY, OKLA.—City council is considering recommendations made by a special water committee for extensions and improvements in municipal waterworks, including pumping plant and filtration station. M. B. Cunningham is city water superintendent.

### Wisconsin

ANTIGO, WIS.—Antigo Auto Wrecking & Iron Co. has been formed here by Jerome Cohler and Eli Cigel, to purchase

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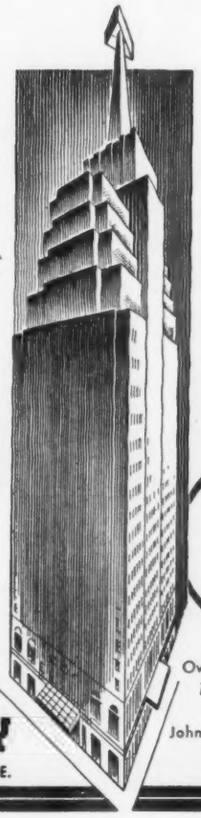

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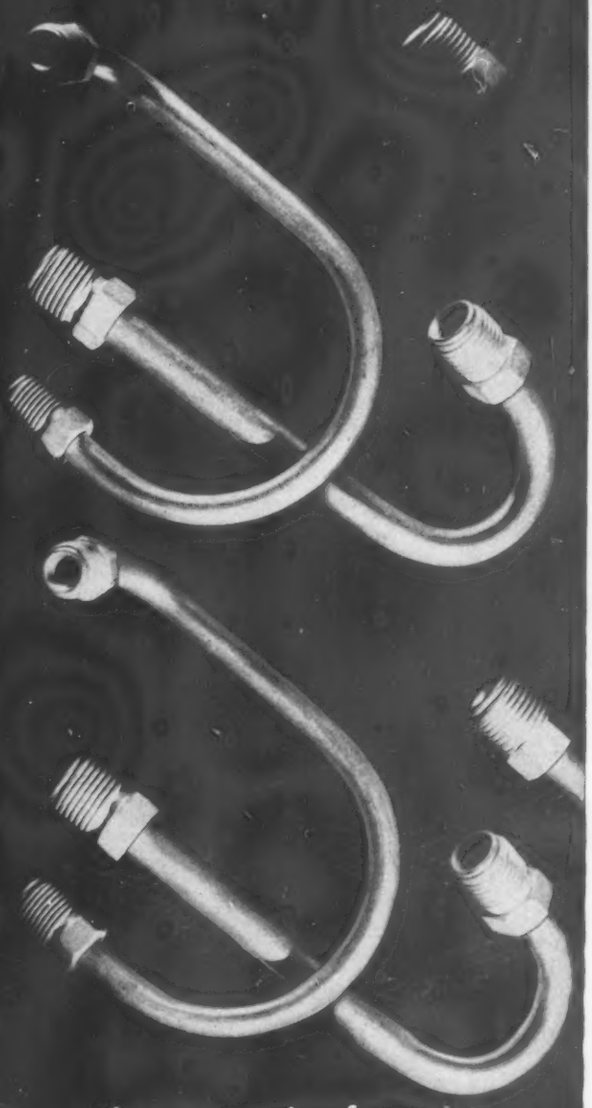

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MILWAUKEE—United States Foundry Corp. has been incorporated with 400 shares of $10 preferred and 500 shares no par common, by Thomas J. Bergen, 152 West Wisconsin avenue; Henry G. Conkel and H. Ziegert, to carry on a foundry, machine shop and manufacturing plant.

SHEBOYGAN, WIS.—Wisconsin Power & Light Co., Madison, Wis., will expand and improve its steam-electric generating station here, and install turbine generator unit and accessories, high pressure boilers and auxiliary equipment. Estimated cost $2,000,000.

WAUKESHA, WIS.—Waukesha Steel Treating Inc., Waukesha, Wis., has been incorporated to engage in commercial steel treatment of metals. Incorporators: J. Dolhun, C. Haufle and D. M. Evans.

WEST ALLIS, WIS. — Kearney & Trecker Corp., 6784 West National avenue, has plans by Klug & Smith Co., 111 East Wisconsin avenue, Milwaukee, for erection of machine shop.

### Minnesota

CLOQUET, MINN.—Northwest Paper Co. Inc. will install electric power equipment in the addition it is erecting to its mill. (Noted Nov. 20).

### Texas

DALLAS, TEX.—Lone Star Gasoline Co., 1915 Wood street, plans installation of power equipment in new distillate refinery and recycling plant, including compressor station, pumping plant, power house and other operating units. Cost about $200,000.

HOUSTON, TEX.—Lone Star Bag & Bagging Co., 2215 Dumble street, will soon let contract for erection of 1-story, 125 x 330-foot factory-type building for manufacturing plant and warehouse. Cost $60,000. L. Gabert, 1315 Bell street, architect.

WAXACHIE, TEX.—P. Baugh, architect Gulf States building, Dallas, Tex., will take bids Jan. 15 for erection of furniture factory to cost $110,000.

### Nebraska

CHADRON, NEBR. — City council, Roselyn Mackey, city clerk, has passed resolution authorizing issuance of $85,000 bonds to finance construction of waterworks plant and system.

OMAHA, NEBR.—Allied Mills Inc. will erect a new boiler plant at its grain mills and will install boiler units and auxiliary equipment. Cost estimated at $40,000.

### Iowa

MT. PLEASANT, IOWA—Iowa Commerce commission has granted authority to Southeast Iowa Electric Co-operative to construct 166 miles of rural transmission lines in Henry county and 38 miles in Jefferson county.

### Colorado

DENVER—National Biscuit Co., 449 West Fourteenth street, New York, plans installation of motors and controls, conveyors and other equipment in new 1-story branch baking plant here. An air conditioning system will also be installed. Estimated cost $1,000,000. Louis Wirsching Jr. is company engineer.

### Nevada

KIMBERLY, NEV.—Consolidated Coppermining Corp., 120 Broadway, New York, proposes erection of mill here and will install transformers and accessories, switchgear and other power substation apparatus, motors, controls, conveyors, electric hoists, loaders and other equipment. Ira B. Joralemon, 315 Montgomery street, San Francisco, has been retained to make survey and report on project.

### Idaho

IDAHO FALLS, IDAHO—City council is considering plans for a municipal hydroelectric power plant.

MOSCOW, IDAHO—Board of regents, University of Idaho, has withdrawn call for bids for $90,000 heating plant expansion at the university here and is considering new specifications, bids to be invited soon. Lincoln Bouillion, Seattle, is engineer.

### Pacific Coast

SAN FRANCISCO—Pacific Gas & Electric Co., 445 Sutter street, is arranging fund of about $25,000,000 for expansion and improvements in power plants and system during 1940.

SEATTLE—Boeing Aircraft Co. has leased the local plant of Fisher Body Co. and will remodel it into an assembly factory, supplementing operations at Boeing's two other local plants.

### Canada

SAULT STE. MARIE, ONT.—Algoma Steel Corp., 503 Queen street, plans extensions to its tin plate mill and other buildings. Will spend about $100,000 for improvements.


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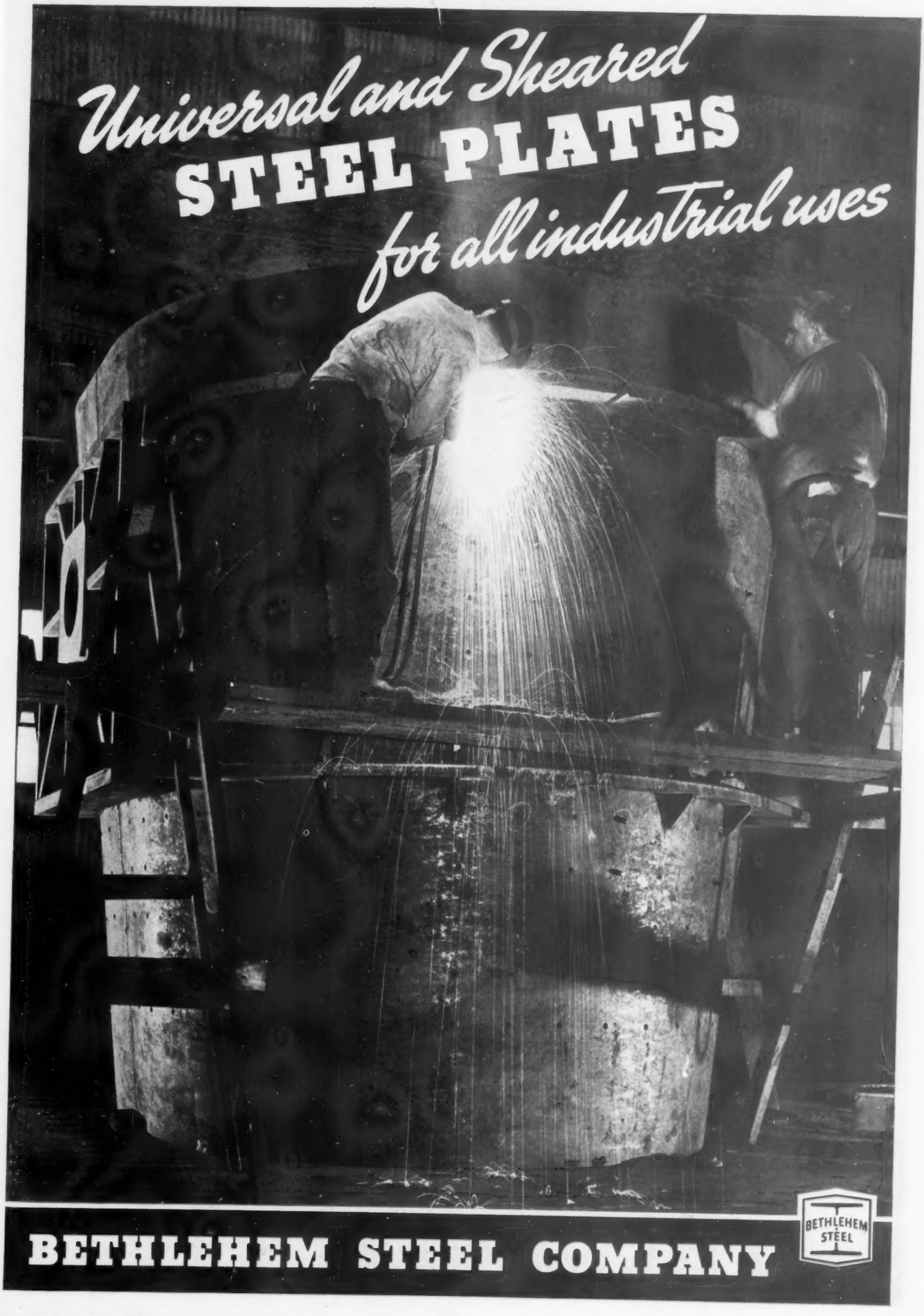
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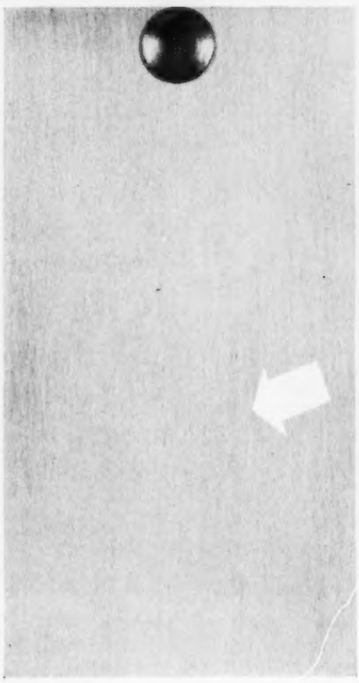

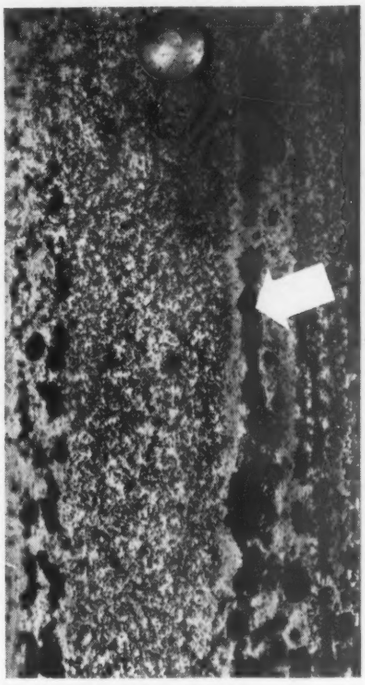

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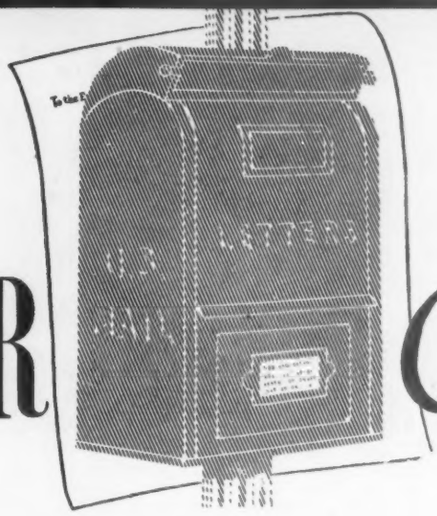
# READER Comments



***Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.***

### Sees Several Good Years

*To the Editor:*

The war in Europe has severely curtailed the sale of portable electric tools to the automotive servicing industries in Europe, on account of the very high taxes on petrol and the many limitations placed on the use of motor cars.

On the other hand, this has been just about offset by an increasing demand for tools from various industrial plants, so that the net result is about the same.

Our business in this country is up about 20 per cent compared with the same quarter last year. While this may be influenced to some extent by the war, due to stimulation of general business, I think it is primarily due to an upswing in the economic cycle, which started before the war. Further, good business will probably continue for several years, despite the outcome of the war.

S. DUNCAN BLACK

*President,*
*Black & Decker Mfg. Co.,*
*Towson, Md.*

### Expects New Outlets

*To the Editor:*

There is very little to say about the effect of the European war on our own business that has not already been said. There is certainly evidence now that a high percentage of the volume of business that was done by the steel industry since the beginning of the European war could be traced as an actual effect of the war. I do not believe that over 60 per cent of the steel that was manufactured since the outbreak of the war was actually consumed. The difference between 60 per cent and 90 to 95 per cent of steel production was purchased for inventory purposes or for assurance of a supply of material in case a shortage developed.

The European war created in the minds of purchasing agents the necessity of protective buying, but it has not created any substantial increase in consumption of American products. In the first instance, it was helpful in inducing sales, but I am afraid that some painful adjustments are not far off.

We have found no shutting off of former outlets because practically 100 per cent of our production is consumed in the United States. On the other hand, we received many inquiries from South American countries which we were not able to encourage and we have also had several inquiries from South Africa.

A continuation of the war, even on the present basis, I believe will open new outlets rather than shut off old ones.

EDWIN J. SOMMER

*President,*
*Mid-States Steel & Wire Co.,*
*Crawfordsville, Ind.*

### Business "Simply Normal"

*To the Editor:*

We do not feel there has been any particular change in our business due to the European war. We have had excellent business both before and after war was declared.

There has been no change in the price of our products and as a result there has been no excess stocking up by our customers and we, therefore, feel that we have simply enjoyed a normal volume of business.

K. D. STEADLEY

*President,*
*The Steadley Co.,*
*Carthage, Mo.*

### Experience Is Valuable

*To the Editor:*

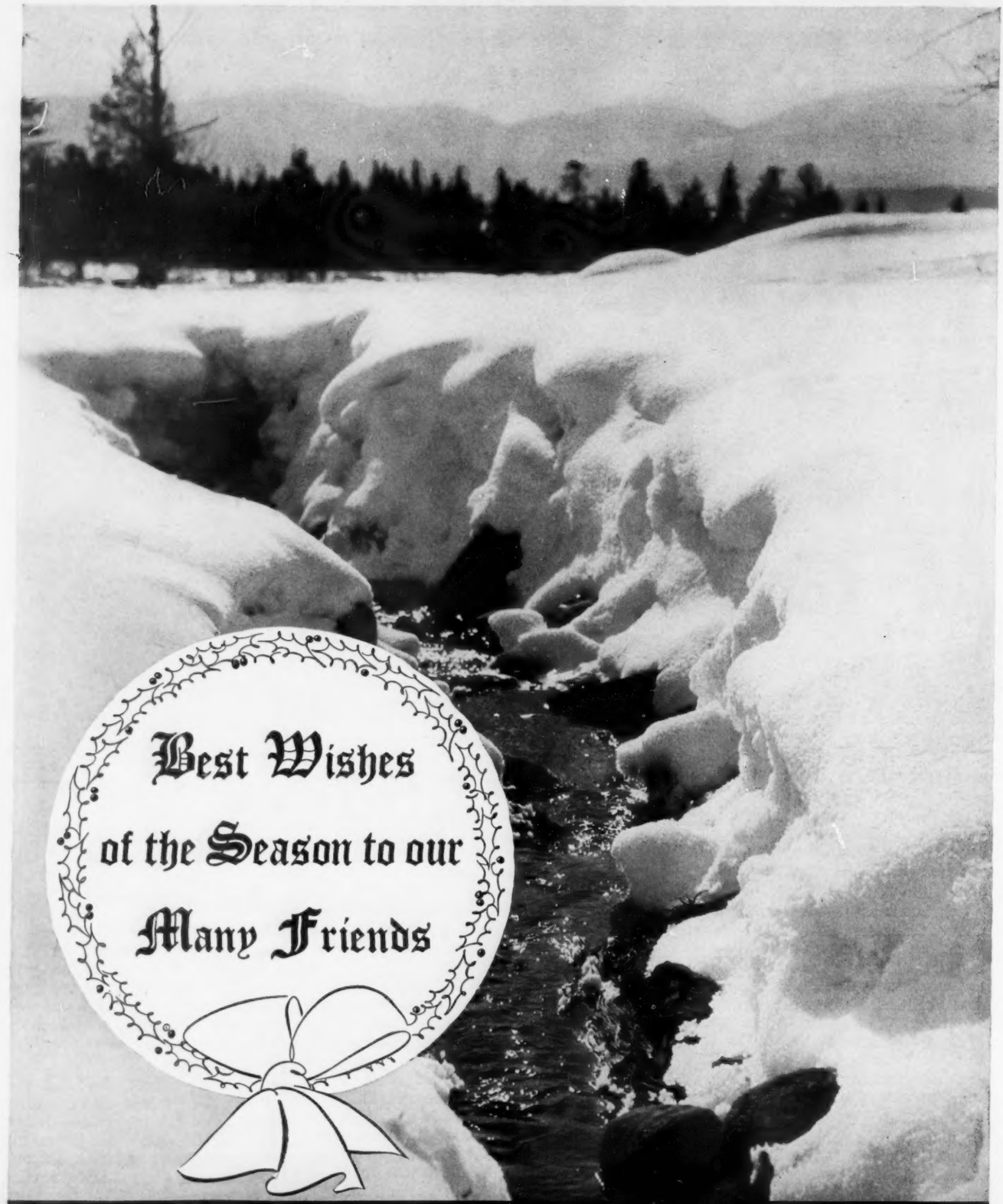
An oldster myself, I was greatly gratified while on a visit to the open house by Landis Tool Co. at Waynesboro, Pa., Dec. 3, to read the record of long-time employes, contained in the company's booklet given to visitors.

Perhaps no small part of the country's leadership in machine tools is a result of such policies, which probably are more prevalent than generally understood. Experience is valuable and with 34 per cent of its employes over 40 the company has a large fund from which to draw.

That view alone is perhaps selfish and there may be some humanitarian factors also, but business would not retain so many workers if they were not valuable. Life may not begin at 40 but there certainly is a lot of it left for a good worker after that age.

MACHINIST

*Boston*

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